English Syntax: An Introduction

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Preface

One important aspect of teaching English syntax (to native speaker students and nonnative speakers alike) involves the balance in the overall approach between facts and theory. We understand that one important goal of teaching English syntax is to help students enhance their understanding of the structure of English in a systematic and scientific way. Basic knowledge of this kind is essential for students to move on the next stages, in which they will be able to perform linguistic analyses for simple as well as complex English phenomena. This new introductory textbook has been developed with this goal in mind. The book focuses primarily on the descriptive facts of English syntax, presented in a way that encourages students to develop keen insights into the English data. It then proceeds with the basic, theoretical concepts of generative grammar from which students can develop abilities to think, reason, and analyze English sentences from linguistic points of view.

We owe a great deal of intellectual debt to the previous textbooks and literature on English syntax. In particular, much of the content, as well as our exercises, has been inspired by and adopted from renowned textbooks such as Aarts (1997), Baker (1997), Borsley (1991, 1996), Radford (1988, 1997, 2004), Sag et al. (2003), to list just a few. We acknowledge our debt to these works, which have set the course for teaching syntax over the years.

Within this book, Chapters 1 to 5 cover the fundamental notions of English grammar. We start with the basic properties of English words, and then rules for combining these words to form well-formed phrases and, ultimately, clauses. These chapters guide students through the basic concepts of syntactic analysis such as lexical categories, phrasal types, heads, complements, and modifiers. In Chapter 4, as a way of formalizing the observed generalizations, the textbook introduces the feature structure system of Head-Driven Phrase Structure Grammar (HPSG, Pollard and Sag (1994), Sag et al. (2003)) which places strong emphasis on the role of lexical properties and the interactions among grammatical components.

From Chapter 6 on, the book discusses major constructions of English within a holistic view of grammar allowing interactions of various grammatical properties including syntactic forms, their grammatical functions, their semantic roles, and overall aspects of clausal meaning. In Chapter 6, we introduce English subject verb agreement, and concentrate on interrelationships
among different grammatical components which play crucial interacting roles in English agreement phenomena. In particular, this chapter shows that once we allow morphological information to interface with the system of syntax, semantics, or even pragmatics, we can provide good solutions for some puzzling English agreement phenomena, within a principled theory. Chapter 7 covers raising and control phenomena, and provides insights into the properties of the two different constructions, which are famously rather similar in terms of syntactic structures, but different in terms of semantics. Chapter 8 deals with the English auxiliary system, itself remarkable in that a relatively small number of elements interact with each other in complicated and intriguing ways. This chapter assigns the precise lexical information to auxiliary verbs and constructional constraints sensitive to the presence of an auxiliary verb. This allows us to express generalizations among auxiliary-sensitive phenomena such as negation, inversion, contraction, and ellipsis, which we would otherwise be missed.

From Chapter 9 through Chapter 12, the textbook discusses how to capture systematic relations between related constructions. Chapter 9 deals with the relationships between active and passive voice clauses. Studying this chapter, students will be able to fully understand why, how, and when to choose between canonical and passive constructions. Chapters 10 and 11 deal with wh-questions and relative clause constructions, often called non-local or long-distance dependency constructions, in the sense that a gap and its filler are in a potentially long-distance relationship. These two chapters present the basic properties of these constructions and show how the mechanism of feature percolation is a crucial part of a systematic account for them. The final chapter of the book covers the so-called ‘tough’ constructions, extraposition, and cleft constructions. These constructions are also based on long-distance dependencies, but different from the constructions in chapters 10 and 11. The goal of all these chapters is to present a groundwork of facts, which students will then have in hand, in order to consider theoretical accounts which apply in precise ways.

We have tried to make each chapter maximally accessible. We provide clear, simple tree diagrams which will help students understand the structures of English and develop analytic skills to English syntax. The theoretical notions are kept as simple yet precise as possible so that students can apply and use them in analyzing English sentences. Each chapter also contains exercises ranging from simple to challenging, aiming to promote deeper understanding of the factual and theoretical contents of each chapter.

Numerous people have helped us in writing this textbook, in various ways. We thank for their comments in various places, help and interest in our textbook: [.............................] We also thank teachers and colleagues in Kyung Hee University and Stanford University for their constant encouragement over the years. Our gratitude also goes to undergraduate and graduate students at Kyung Hee University, especially to Dongjun Lee, Juwon Lee, and Hana Cho for their administrative help. We also thank Dikran Karagueuzian, Director of CSLI Publications, for his patience and support, as well as Lauri Kanerva for his help in matters of production. We also thank Kaunghi Koh for helping us with LaTeX problems.

Lastly, but not the least, we also truly thank our close friends and family members who gave
us unconditional love and support in every possible regard. We dedicate this book to our beloved ones who with true love and refreshing and comforting words have lead us to think ‘wise and syntactic’ when we are spiritually and physically down.
Some Basic Properties of English Syntax

1.1 Some Remarks on the Essence of Human Language

One of the crucial functions of any human language, such as English or Korean, is to convey various kinds of information from the everyday to the highly academic. Language provides a means for us to describe how to cook, how to remove cherry stains, how to understand English grammar, or how to provide a convincing argument. We commonly consider certain properties of language to be key essential features from which the basic study of linguistics starts.

The first well-known property (as emphasized by Ferdinand de Saussure 1916) is that there is no motivated relationship between sounds and meanings. This is simply observed in the fact that the same meaning is usually expressed by a different sounding-word in a different language (think of house, maison, casa). For words such as hotdog, desk, dog, bike, hamburger, cranberry, sweetbread, their meanings have nothing to do with their shapes. For example, the word hotdog has no relationship with a dog which is or feels hot. There is just an arbitrary relationship between the word’s sound and its meaning: this relationship is decided by the convention of the community the speakers belong to.

The second important feature of language, and one more central to syntax, is that language makes infinite use of finite set of rules or principles, the observation of which led the development of generative linguistics in the 20th century (cf. Chomsky 1965). A language is a system for combining its parts in infinitely many ways. One piece of evidence of the system can be observed in word-order restrictions. If a sentence is an arrangement of words and we have 5 words such as man, ball, a, the, and kicked, how many possible combinations can we have from these five words? More importantly, are all of these combinations grammatical sentences? Mathematically, the number of possible combinations of 5 words is 5! (factorial), equalling 120 instances. But among these 120 possible combinations, only 6 form grammatical English sentences.\(^1\)

\begin{enumerate}
\item a. The man kicked a ball.
\end{enumerate}

\(^1\)Examples like (1e) and (1f) are called ‘topicalization’ sentences in which the topic expression (the ball and the man), already mentioned and understood in the given context, is placed in the sentence initial position. See Lambrecht (1994) and references therein.
b. A man kicked the ball.
c. The ball kicked a man.
d. A ball kicked the man.
e. The ball, a man kicked.
f. The man, a ball kicked.

All the other 114 combinations, a few of which are given in (2), are unacceptable to native speakers of English. We use the notation * to indicate that a hypothesized example is ungrammatical.

(2) a. *Kicked the man the ball.
b. *Man the ball kicked the.
c. *The man a ball kicked.

It is clear that there are certain rules in English for combining words. These rules constrain which words can be combined together or how they may be ordered, sometimes in groups, with respect to each other.

Such combinatory rules also play important roles in our understanding of the syntax of an example like (3a). Whatever these rules are, they should give a different status to (3b), an example which is judged ungrammatical by native speakers even though the intended meaning of the speaker is relatively clear and understandable.

(3) a. Kim lives in the house Lee sold to her.
b. *Kim lives in the house Lee sold it to her.

The requirement of such combinatory knowledge also provides an argument for the assumption that we use just a finite set of resources in producing grammatical sentences, and that we do not just rely on the meaning of words involved. Consider the examples in (4):

b. Kim is fond of Lee.

Even though it is not difficult to understand the meaning of (4a), English has a structural requirement for the verb is as in (4b).

More natural evidence of the ‘finite set of rules and principles’ idea can be found in cognitive, creative abilities. Speakers are unconscious of the rules which they use all the time, and have no difficulties in producing or understanding sentences which they have never heard, seen, or talked about before. For example, even though you may well not have seen the following sentence before, you can understand its meaning if you have a linguistic competence in English:

(5) In January 2002, a dull star in an obscure constellation suddenly became 600,000 times more luminous than our Sun, temporarily making it the brightest star in our galaxy.

2 Starting in Chapter 2, we will see these combinatory rules.
A related part of this competence is that a language speaker can produce an infinite number of grammatical sentences. For example, given the simple sentence (6a), we can make a more complex one like (6b) by adding the adjective tall. To this sentence, we can again add another adjective handsome as in (6c). We could continue adding adjectives, theoretically enabling us to generate an infinitive number of sentences:

(6)  a. The man kicked the ball.
    b. The tall man kicked the ball.
    c. The handsome, tall man kicked the ball.
    d. The handsome, tall, nice man kicked the ball.
    e. . . .

One might argue that since the number of English adjectives could be limited, there would be a dead-end to this process. However, no one would find themselves lost for another way to keep the process going (cf. Sag et al. 2003):

(7)  a. Some sentences can go on.
    b. Some sentences can go on and on.
    c. Some sentences can go on and on and on.
    d. Some sentences can go on and on and on and on.
    e. . . .

To (7a), we add the string and on, producing a longer one (7b). To this resulting sentence (7c), we once again add and on. We could in principle go on adding without stopping: this is enough to prove that we could make an infinite number of well-formed English sentences.³

Given these observations, how then can we explain the fact that we can produce or understand an infinite number of grammatical sentences that we have never heard or seen before? It seems implausible to consider that we somehow memorize every example, and in fact we do not (Pullum and Scholz 2002). We know that this could not be true, in particular when we consider that native speakers can generate an infinite number of infinitely long sentences, in principle. In addition, there is limit to the amount of information our brain can keep track of, and it would be implausible to think that we store an infinite number of sentences and retrieve whenever we need to do so.

These considerations imply that a more appropriate hypothesis would be something like (8):⁴

(8) All native speakers have a grammatical competence which can generate an infinite set of grammatical sentences from a finite set of resources.

³Think of a simple analogy: what is the longest number? Yet, how many numbers do you know? The second question only makes sense if the answer is 0–9 (ten digits).

⁴The notion of ‘competence’ is often compared with that of ‘performance’ (Chomsky 1965). Competence refers to speakers’ internalized knowledge of their language, whereas performance refers to actual usage of this abstract knowledge of language.
This hypothesis has been generally accepted by most linguists, and has been taken as the subject matter of syntactic theory. In terms of grammar, this grammatical competence is hypothesized to characterize a generative grammar, which we then can define as follows (for English, in this instance):

(9) Generative Grammar:

An English generative grammar is the one that can generate an infinite set of well-formed English sentences from a finite set of rules or principles.

The job of syntax is thus to discover and formulate these rules or principles. These rules tell us how words are put together to form grammatical phrases and sentences. Generative grammar, or generative syntax, thus aims to define these rules which will characterize all of the sentences which native speakers will accept as well-formed and grammatical.

1.2 How We Discover Rules

How can we then find out what the generative rules of English syntax are? These rules are present in the speakers’ minds, but are not consciously accessible; speakers cannot articulate their content, if asked to do so. Hence we discover the rules indirectly, and of the several methods for inferring these hidden rules, hypotheses based on the observed data of the given language are perhaps the most reliable. These data can come from speakers’ judgments – known as intuitions – or from collected data sets – often called corpora. Linguistics is in one sense an empirical science as it places a strong emphasis on investigating the data underlying a phenomenon of study.

The canonical steps for doing empirical research can be summarized as follows:

- Step I: Data collection and observation.
- Step II: Make a hypothesis to cover the first set of data.
- Step III: Check the hypothesis with more data.
- Step IV: Revise the hypothesis, if necessary.

Let us see how these steps work for discovering one of the grammar rules in English, in particular, the rule for distinguishing count and non-count nouns:

[Step I: Observing Data] To discover a grammar rule, the first thing we need to do is to check out grammatical and ungrammatical variants of the expression in question. For example,

5In generative syntax, ‘rules’ refers not to ‘prescriptive rules’ but to ‘descriptive rules’. Prescriptive rules are those which disfavor or even discredit certain usages; these prescribe forms which are generally in use, as in (i). Meanwhile, descriptive rules are meant to characterize whatever forms speakers actually use, with any social, moral, or intellectual judgement.

(i) a. Do not end a sentence with a preposition.
   b. Avoid double negatives.
   c. Avoid split infinitives.

The spoken performance of most English speakers will often contain examples which violate such prescriptive rules.

6Much of the discussion and data in this section here are adopted from Baker (1995).
let us look at the usage of the word *advice*:

(10) Data Set 1:

a. *The professor gave John some good advices.

b. *The president was hoping for a good advice.

c. *The advice that John got was more helpful than the one that Smith got.

What can you tell from these examples? We can make the following observations:

(11) Observation 1:

a. *advice* cannot be used in the plural.

b. *advice* cannot be used with the indefinite article *a(n)*.

c. *advice* cannot be referred to by the pronoun *one*.

In any scientific research one example is not enough to draw any conclusion. However, we can easily find more words that behave like *advice*:

(12) Data Set 2:

a. *We had hoped to get three new furniture every month, but we only had enough money to get a furniture every two weeks.

b. *The furniture we bought last year was more expensive than the one we bought this year.

We thus extend Observation 1 a little bit further:

(13) Observation 2:

a. *advice/furniture* cannot be used in the plural.

b. *advice/furniture* cannot be used with the indefinite article *a(n)*.

c. *advice/furniture* cannot be referred to by the pronoun *one*.

It is usually necessary to find contrastive examples to understand the range of a given observation. For instance, words like *suggestion* and *armchair* act differently:

(14) Data Set 3: *suggestion*

a. The mayor gave John some good suggestions.

b. The president was hoping for a good suggestion.

c. The suggestion that John got was more helpful than the one that Smith got.

(15) Data Set 4: *armchair*

a. The mayor gave John some good armchairs.

b. The president was hoping for a good armchair.

c. The armchair that Jones got was more helpful than the one that Smith got.

Unlike *furniture* and *advice*, the nouns *suggestion* and *armchair* can be used in the test linguistic contexts we set up. We thus can add Observation 3, different from Observation 2:

(16) Observation 3:
a. *suggestion/armchair can be used in the plural.
b. *suggestion/armchair can be used with the indefinite article *a(n).
c. *suggestion/armchair can be referred to by the pronoun *one.

[Step II: Forming a Hypothesis] From the data and observations we have made so far, can we make any hypothesis about the English grammar rule in question? One hypothesis that we can make is something like the following:

(17) First Hypothesis:
English has at least two groups of nouns, Group I (count nouns) and Group II (non-count nouns), diagnosed by tests of plurality, the indefinite article, and the pronoun *one.

[Step III: Checking the Hypothesis] Once we have formed such a hypothesis, we need to check out if it is true of other data, and also see if it can bring other analytical consequences.

A little further thought allows us to find support for the two-way distinction for nouns. For example, consider the usage of *much and *many:

(18) a. much information, much furniture, much advice
    b. *much suggestion, *much armchair, *much clue
(19) a. *many information, *many furniture, *many advice
    b. many suggestions, many armchairs, many clues

As observed here, count nouns can occur only with *many, whereas non-count nouns can combine with *much. Similar support can be found from the usage of *little and *few:

(20) a. little furniture, little advice, little information
    b. *little suggestion, *little armchair, *little clue
(21) a. *few furniture, *few advice, *few information
    b. few suggestions, few armchairs, few clues

The word *little can occur with non-count nouns like advice, yet *few cannot. Meanwhile, *few occurs only with count nouns.

Given these data, it appears that the two-way distinction is quite plausible and persuasive. We can now ask if this distinction into just two groups is really enough for the classification of nouns. Consider the following examples with *cake:

(22) a. The mayor gave John some good cakes.
    b. The president was hoping for a good cake.
    c. The cake that Jones got was more delicious than the one that Smith got.

Similar behavior can be observed with a noun like *beer, too:

(23) a. The bartender gave John some good beers.
b. No one knows how to tell from a good beer to a bad one.

These data show us that cake and beer may be classified as count nouns. However, observe the following:

(24) a. My pastor says I ate too much cake.
    b. The students drank too much beer last night.

(25) a. We recommend to eat less cake and pastry.
    b. People now drink less beer.

The data mean that cake and beer can also be used as non-count nouns since that can be used with less or much.

[Step IV: Revising the Hypothesis] The examples in (24) and (25) imply that there is another group of nouns that can be used as both count and non-count nouns. This leads us to revise the hypothesis in (17) as following:

(26) Revised Hypothesis:

There are at least three groups of nouns: Group 1 (count nouns), Group 2 (non-count nouns), and Group 3 (count and non-count).

We can expect that context will determine whether a Group 3 noun is used as count or as non-count.

As we have observed so far, the process of finding finite grammar rules crucially hinges on finding data, drawing generalizations, making a hypothesis, and revising this hypothesis with more data.

1.3 Why Do We Study Syntax and What Is It Good for?

There are many reasons for studying syntax, from general humanistic or behavioral motivations to much more specific goals such as those in the following:

- To help us to illustrate the patterns of English more effectively and clearly.
- To enable us to analyze the structure of English sentences in a systematic and explicit way.

For example, let us consider how we could use the syntactic notion of head, which refers to the essential element within a phrase. The following is a short and informal rule for English subject-verb agreement.7

(27) In English, the main verb agrees with the head element of the subject.

This informal rule can pinpoint what is wrong with the following two examples:

(28) a. *The recent strike by pilots have cost the country a great deal of money from tourism and so on.
    b. *The average age at which people begin to need eyeglasses vary considerably.

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7The notion of ‘subject’ is further discussed in Chapter 3 and that of ‘head’ in Chapter 4.
Once we have structural knowledge of such sentences, it is easy to see that the essential element of the subject in (28a) is not pilots but strike. This is why the main verb should be has but not have to observe the basic agreement rule in (27). Meanwhile, in (28b), the head is the noun age, and thus the main verb vary needs to agree with this singular noun. It would not do to simply talk about ‘the noun’ in the subject in the examples in (28), as there is more than one. We need to be able to talk about the one which gives its character to the phrase, and this is the head. If the head is singular, so is the whole phrase, and similarly for plural. The head of the subject and the verb (in the incorrect form) are indicated in (29):

(29)  

a. *[The recent strike by pilots] have cost the country a great deal of money from tourism and so on.

b. *[The average age at which people begin to need eyeglasses] vary considerably.

Either example can be made into a grammatical version by pluralizing the head noun of the subject.

Now let us look at some slightly different cases. Can you explain why the following examples are unacceptable?

(30)  

a. *Despite of his limited educational opportunities, Abraham Lincoln became one of the greatest intellectuals in the world.

b. *A pastor was executed, notwithstanding on many applications in favor of him.

To understand these examples, we first need to recognize that the words despite and notwithstanding are prepositions, and further that canonical English prepositions combine only with noun phrases. In (30), these prepositions combine with prepositional phrases again (headed by of and on respectively), violating this rule.

A more subtle instance can be found in the following:

(31)  

a. Visiting relatives can be boring.

b. I saw that gas can explode.

These examples each have more than one interpretation. The first one can mean either that the event of seeing our relatives is a boring activity, or that the relatives visiting us are themselves boring. The second example can either mean that a specific can containing gas exploded, which I saw, or it can mean that I observed that gas has a possibility of exploding. If one knows English syntax, that is, if one understands the syntactic structure of these English sentences, it is easy to identify these different meanings.

Here is another example which requires certain syntactic knowledge:

(32)  

He said that that ‘that’ that that man used was wrong.

This is the kind of sentence one can play with when starting to learn English grammar. Can you analyze it? What are the differences among these five thats? Structural (or syntactic) knowledge can be used to diagnose the differences. Part of our study of syntax involves making clear exactly how each word is categorized, and how it contributes to a whole sentence.
When it comes to understanding a rather complex sentence, knowledge of English syntax can be a great help. Syntactic or structural knowledge helps us to understand simple as well as complex English sentences in a systematic way. There is no difference in principle between the kinds of examples we have presented above and (33):

(33) The government’s plan, which was elaborated in a document released by the Treasury yesterday, is the formal outcome of the Government commitment at the Madrid summit last year to put forward its ideas about integration.

Apart from having more words than the examples we have introduced above, nothing in this example is particularly complex.

1.4 Exercises

1. Consider the following list of nouns:

   (i) vehicle, traffic, stuff, knowledge, hair, discussion, luggage, suitcase, difficulty, experience, broccoli, orange, activity, light, lightning

For each of these nouns, decide if it can be used as a count or as a non-count (mass) noun. In doing so, construct acceptable and unacceptable examples using the tests (plurality, indefinite article, pronoun one, few/little, many/much tests) we have discussed in this chapter.

2. Check or find out whether each of the following examples is grammatical or ungrammatical. For each ungrammatical one, provide at least one (informal) reason for its ungrammaticality, according to your intuitions or ideas.

   (i) a. Kim and Sandy is looking for a new bicycle.
   b. I have never put the book.
   c. The boat floated down the river sank.
   d. Chris must liking syntax.
   e. There is eager to be fifty students in this class.
   f. Which chemical did you mix the hydrogen peroxide and?
   g. There seem to be a good feeling developing among the students.
   h. Strings have been pulled many times to get students into that university.

3. Consider the following set of data, focusing on the usage of ‘self’ reflexive pronouns and personal pronouns:

   (i) a. He washed himself.
   b. *He washed herself.
   c. *He washed myself.
   d. *He washed ourselves.
(ii) a. *He washed him. (‘he’ and ‘him’ referring to the same person)
   b. He washed me.
   c. He washed her.
   d. He washed us.

Can you make a generalization about the usage of ‘self’ pronouns and personal pronouns like he here? Also consider the following imperatives:

(iii) a. Wash yourself.
     b. Wash yourselves.
     c. *Wash myself.
     d. *Wash himself.

(iv) a. *Wash you!
     b. Wash me!
     c. Wash him!

Can you explain why we can use yourself and yourselves but not you as the object of the imperatives here?

4. Read the following passage and identify all the grammatical errors. If you can, discuss the relevant grammar rules that you can think of.

(i) Grammar is important because it is the language that make it possible for us to talk about language. Grammar naming the types of words and word groups that make up sentences not only in English but in any language. As human beings, we can putting sentences together even as children—we can all do grammar. People associate grammar for errors and correctness. But knowing about grammar also helps us understood what makes sentences and paragraphs clearly and interesting and precise. Grammar can be part of literature discussions, when we and our students closely reading the sentences in poetry and stories. And knowing about grammar means finding out that all language and all dialect follow grammatical patterns.  

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8Adapted from “Why is Grammar Important?” by The Assembly for the Teaching of English Grammar
2

From Words to Major Phrase Types

2.1 Introduction

In Chapter 1, we observed that the study of English syntax is the study of rules which generate an infinite number of grammatical sentences. These rules can be inferred from observations about the English data. One simple mechanism we recognize is that in forming grammatical sentences, we start from words, or ‘lexical’ categories. These lexical categories then form a larger constituent ‘phrase’; and phrases go together to form a ‘clause’. A clause either is, or is part of, a well-formed sentence.

Typically we use the term ‘clause’ to refer to a complete sentence-like unit, but which may be part of another clause, as a subordinate or adverbial clause. Each of the sentences in (1b)–(1d) contains more than one clause, in particular, with one clause embedded inside another:

(1) a. The weather is lovely today.
   b. I am hoping [that the weather is lovely today].
   c. [If the weather is lovely today] then we will go out.
   d. The birds are singing [because the weather is lovely today].

This chapter deals with what kind of combinatorial rules English employs in forming these phrases, clauses, and sentences.

2.2 Lexical Categories

2.2.1 Determining the Lexical Categories

The basic units of syntax are words. The first question is then what kinds of words (also known as parts of speech, or lexical categories, or grammatical categories) does English have? Are they simply noun, verb, adjective, adverb, preposition, and maybe a few others? Most of us would not be able to come up with simple definitions to explain the categorization of words. For instance, why do we categorize book as a noun, but kick as a verb? To make it more difficult, how do we know that virtue is a noun, that without is a preposition, and that well is an adverb (in one meaning)?

Words can be classified into different lexical categories according to three criteria: meaning,
morphological form, and syntactic function (distribution). Let us check what each of these criteria means, and how reliable each one is.

At first glance, it seems that words can be classified depending on their meaning. For example, we could have the following rough semantic criteria for N (noun), V (verb), A (adjective), and Adv (adverb):

(2) a. N: referring to an individual or entity
b. V: referring to an action
c. A: referring to a property
d. Adv: referring to the manner, location, time or frequency of an action

Though such semantic bases can be used for many words, these notional definitions leave a great number of words unaccounted for. For example, words like sincerity, happiness, and pain do not simply denote any individual or entity. Absence and loss are even harder cases.

There are also many words whose semantic properties do not match the lexical category that they belong to. For example, words like assassination and construction may refer to an action rather than an individual, but they are always nouns. Words like remain, bother, appear, and exist are verbs, but do not involve any action.

A more reliable approach is to characterize words in terms of their forms and functions. The ‘form-based’ criteria look at the morphological form of the word in question:

(3) a. N: ___ + plural morpheme -(e)s
b. N: ___ + possessive ’s
c. V: ___ + past tense -ed or 3rd singular -(e)s
d. V: ___ + 3rd singular -(e)s
e. A: ___ + -er/est (or more/most)
f. A: ___ + -ly (to create an adverb)

According to these frames, where the word in question goes in the place indicated by __, nouns allow the plural marking suffix -(e)s to be attached, or the possessive ’s, whereas verbs can have the past tense -ed or the 3rd singular form -(e)s. Adjectives can take comparative and superlative endings -er or -est, or combine with the suffix -ly. (4) shows some examples derived from these frames:

(4) a. N: trains, actors, rooms, man’s, sister’s, etc.
b. V: devoured, laughed, devours,laughs, etc.
c. A: fuller, fullest, more careful, most careful, etc.
d. Adv: fully, carefully, diligently, clearly, etc.

The morphological properties of each lexical category cannot be overridden; verbs cannot have plural marking, nor can adjectives have tense marking. It turns out, however, that these morphological criteria are also only of limited value. In addition to nouns like information and furniture that we presented in Chapter 1, there are many nouns such as love and pain that do not have
a plural form. There are adjectives (such as absent and circular) that do not have comparative -er or superlative -est forms, due to their meanings. The morphological (form-based) criterion, though reliable in many cases, are not necessary and sufficient conditions for determining the type of lexical categories.

The most reliable criterion in judging the lexical category of a word is based on its function or distributional possibilities. Let us try to determine what kind of lexical categories can occur in the following environments:

(5) a. They have no __.
b. They can __.
c. They read the __ book.
d. He treats John very __.
e. He walked right __ the wall.

The categories that can go in the blanks are N, V, A, Adv, and P (preposition). As can be seen in the data in (6), roughly only one lexical category can appear in each position:

(6) a. They have no TV/car/information/friend.
b. They have no *went/*in/*old/*very/*and.

(7) a. They can sing/run/smile/stay/cry.
b. They can *happy/*down/*door/*very.

(8) a. They read the big/new/interesting/scientific book.
b. They read the *sing/*under/*very book.

(9) a. He treats John very nicely/badly/kindly.
b. He treats John very *kind/*shame/*under.

(10) a. He walked right into/on the wall.
b. He walked right *very/*happy/*the wall.

As shown here, only a restricted set of lexical categories can occur in each position; we can then assign a specific lexical category to these elements:

(11) a. N: TV, car, information, friend, . . .
b. V: sing, run, smile, stay, cry, . . .
c. A: big, new, interesting, scientific, . . .
d. Adv: nicely, badly, kindly, . . .
e. P: in, into, on, under, over, . . .

In addition to these basic lexical categories, does English have other lexical categories? There are a few more. Consider the following syntactic environments:

(12) a. __ student hits the ball.
b. John sang a song, __ Mary played the piano.
c. John thinks __ Bill is honest.
The only words that can occur in the open slot in (12a) are words like *the, a, this, that*, and so forth, which are determiner (Det). (12b) provides a frame for conjunctions (Conj) such as *and, but, so, for, or, yet.* In (12c), we can have the category we call ‘complementizer’, here the word *that* – we return to these in (16) below.

Can we find any supporting evidence for such lexical categorizations? It is not so difficult to construct environments in which only these lexical elements appear. Consider the following:

(13) We found out that _ jobs were in jeopardy.

Here we see that only words like *the, my, his, some, few, these, those*, and so forth can occur here. These articles, possessives, quantifiers, and demonstratives all ‘determine’ the referential properties of *jobs* here, and for this reason, they are called determiners. One clear piece of evidence for grouping these elements as the same category comes from the fact that they cannot occupy the same position at the same time:

(14) a. *[My these jobs] are in jeopardy.
   b. *[Some my jobs] are in jeopardy.
   c. *[The his jobs] are in jeopardy.

Words like *my* and *these* or *some* and *my* cannot occur together, indicating that they compete with each other for just one structural position.

Now consider the following examples:

(15) a. I think _ learning English is not easy at all.
   b. I doubt _ you can help me in understanding this.
   c. I am anxious _ you to study English grammar hard.

Once again, the possible words that can occur in the specific slot in (16) are strictly limited.

(16) a. I think *that* [learning English is not all that easy].
   b. I doubt *if* [you can help me in understanding this].
   c. I am anxious *for* [you to study English grammar hard].

The italicized words here are different from the other lexical categories that we have seen so far. They introduce a complement clause, marked above by the square brackets, and may be sensitive to the tense of that clause. A tensed clause is known as a ‘finite’ clause, as opposed to an infinitive. For example, *that* and *if* introduce or combine with a tensed sentence (present or past tense), whereas *for* requires an infinitival clause marked with *to*. We cannot disturb these relationships:

(17) a. *I think *that* [learning English to be not all that easy].
   b. *I doubt *if* [you to help me in understanding this].
   c. *I am anxious *for* [you should study English grammar hard].

---

9These conjunctions are ‘coordinating conjunctions’ different from ‘subordinating conjunctions’ like *when, if, since, though*, and so forth. The former conjoins two identical phrasal elements whereas the latter introduces a subordinating clause as in *[Though students wanted to study English syntax], the department decided not to open that course this year.*
The term ‘complement’ refers to an obligatory dependent clause or phrase relative to a head.\textsuperscript{10} The italicized elements in (17) introduce a clausal complement and are consequently known as ‘complementizers’ (abbreviated as ‘C’). There are only a few complementizers in English (that, for, if, and whether), but nevertheless they have their own lexical category.

Now consider the following environments:

(18) a. John __ not leave.
    b. John __ drink beer last night.
    c. __ John leave for Seoul tomorrow?
    d. John will study syntax, and Mary __, too.

The words that can appear in the blanks are neither main verbs nor adjectives, but rather words like will, can, shall and must. In English, there is clear evidence that these verbs are different from main verbs, and we call them auxiliary verbs (Aux). The auxiliary verb appears in front of the main verb, which is typically in its citation form, which we call the ‘base’ form. Note the change in the main verb form in (19b) when the negation is added:

(19) a. He left.
    b. He did not leave.

There is also one type of to which is auxiliary-like. Consider the examples in (20) and (21):

(20) a. Students wanted to write a letter.
    b. Students intended to surprise the teacher.

(21) a. Students objected to the teacher.
    b. Students sent letters to the teacher.

It is easy to see that in (21), to is a preposition. But how about the infinitival marker to in (20), followed by a base verb form? What lexical category does it belong to? Though the detailed properties of auxiliary verbs will not be discussed until Chapter 8, we treat the infinitival marker to as an auxiliary verb. For example, we can observe that to behaves like an auxiliary verb should:

(22) a. It is crucial for John to show an interest.
    b. It is crucial that John should show an interest.

(23) a. I know I should [go to the dentist’s], but I just don’t want to.
    b. I don’t really want to [go to the dentist’s], but I know I should.

In (22), to and should introduce the clause and determines the tenseness of the clause. In (23), they both can license the ellipsis of its VP complement.\textsuperscript{11}

Another property to shares with other auxiliary verbs like will is that it requires a base verb to follow. Most auxiliary verbs are actually finite forms which therefore pattern with that in a finite clause, while the infinitival clause introduced by for is only compatible with to:

\textsuperscript{10}See Chapter 4 for a fuller discussion of ‘head’ and ‘complement’.

\textsuperscript{11}See Chapter 8 for detailed discussion on the ellipsis.
(24)  a. She thought it was likely [that everyone *to/might/would fit into the car].
    b. She thought it was easy [for everyone to/*might/*would fit into the car].

Finally, there is one remaining category we need to consider, the ‘particles’ (Part), illustrated in (25):

(25)  a. The umpire called off the game.
    b. The two boys looked up the word.

Words like off and up here behave differently from prepositions, in that they can occur after the object.

(26)  a. The umpire called the game off.
    b. The two boys looked the word up.

Such distributional possibilities cannot be observed with true prepositions:

(27)  a. The umpire fell off the deck.
    b. The two boys looked up the high stairs (from the floor).

(28)  a. *The umpire fell the deck off.
    b. *The students looked the high stairs up (from the floor).

We can also find differences between particles and prepositions in combination with an object pronoun:

(29)  a. The umpire called it off. (particle)
    b. *The umpire called off it.

(30)  a. *The umpire fell it off.
    b. The umpire fell off it. (preposition)

The pronoun it can naturally follow the preposition as in (30b), but not the particle in (29b).

Such contrasts between prepositions and particles give us ample reason to introduce another lexical category Part (particle) which is differentiated from P (preposition). In the next section, we will see more tests to differentiate these two types of word.

2.2.2 Content vs. function words

The lexical categories we have seen so far can be classified into two major word types: content and function. Content words are those with substantive semantic content, whereas function words are those primarily serving to carry grammatical information. If we remove the words of category Det, Aux, and P from the examples in (31), we have the examples in (32):

(31)  a. The student will take a green apple.
    b. The teachers are fond of Bill.

(32)  a. *Student take green apple
    b. *Teachers fond Bill.
Even though these are ungrammatical, we get some meaning from the strings, since the remaining N, V, and A words include the core meaning of the examples in (31). These ‘content’ words are also known as ‘open class’ words since the number of such words is unlimited, and new words can be added every day.

(33) Content words:
   a. N: computer, email, fax, Internet, . . .
   b. A: happy, new, large, grey, tall, exciting, . . .
   c. V: email, grow, hold, have, run, smile, make, . . .
   d. Adv: really, completely, also, well, quickly, . . .

In contrast, function words are mainly used to indicate the grammatical functions of other words, and are ‘closed class’ items: only about 300 function words exist in English, and new function words are only very rarely added into the language:

(34) a. P: of, at, in, without, between, . . .
    b. Det: the, a, that, my, more, much, . . .
    c. Conj: and, that, when, while, although, or, . . .
    d. Aux: can, must, will, should, ought, . . .
    e. C: for, whether, that, . . .
    f. Part: away, over, off, out, . . .

2.3 Grammar with Lexical Categories

As noted in Chapter 1, the main goal of syntax is building a grammar that can generate an infinite set of well-formed, grammatical English sentences. Let us see what kind of grammar we can develop now that we have lexical categories. To start off, we will use the examples in (35):

(35) a. A man kicked the ball.
    b. A tall boy threw the ball.
    c. The cat chased the long string.
    d. The happy student played the piano.

Given only the lexical categories that we have identified so far, we can set up a grammar rule for sentence (S) like the following:

(36) S → Det (A) N V Det (A) N

The rule tells us what S can consist of: it must contain the items mentioned, except that those which are in parentheses are optional. So this rule characterizes any sentence which consists of a Det, N, V, Det, and N, in that order, possibly with an A in front of either N. We can represent the core items in a tree structure as in (37):
We assume a lexicon, a list of categorized words, to be part of the grammar along with the rule in (36):

(38)  
   a. Det: a, that, the, this, . . .  
   b. N: ball, man, piano, string, student, . . .  
   c. V: kicked, hit, played, sang, threw, . . .  
   d. A: handsome, happy, kind, long, tall, . . .

By inserting lexical items into the appropriate pre-terminal nodes in the structure, where the labels above . . . are, we can generate grammatical examples like those (35) as well as those like the following, not all of which describe a possible real-world situation:

(39)  
   a. That ball hit a student.  
   b. The piano played a song.  
   c. The piano kicked a student.  
   d. That ball sang a student.

Such examples are all syntactically well-formed, even if semantically in some cases, implying that syntax is rather ‘autonomous’ from semantics. Note that any anomalous example can be preceded by the statement “Now, here’s something hard to imagine: . . .”.

Notice that even this simple grammar rule can easily extend to generate an infinite number of English sentences by allowing iteration of the A:

(40) \[ S \rightarrow \text{Det A}^* \text{N} \text{V Det A}^* \text{N} \]

The operator allows us to repeat any number of As, thereby generating sentences like (41). Note that the parentheses around ‘A’ in (37) are no longer necessary in this instance, for the Kleene Star operator means any number including zero.

(41)  
   a. The tall man kicked the ball.  
   b. The tall, handsome man kicked the ball.  
   c. The tall, kind, handsome man kicked the ball.

One could even generate a sentence like (42):

(42)  The happy, happy, happy, happy, happy man sang a song.

---

12 See Exercise 9 of this chapter and the discussion of ‘selectional restrictions’ in Chapter 4.
13 This iteration operator \(^*\) is called the ‘Kleene Star Operator’, and is a notation meaning ‘zero to infinitely many’ occurrences. It should not be confused with the \(^*\) prefixed to a linguistic example, indicating ungrammaticality.
A grammar using only lexical categories can be specified to generate an infinite number of well-formed English sentences, but it nevertheless misses a great deal of basic properties that we can observe. For example, this simple grammar cannot capture the agreement facts seen in examples like the following:

(43) a. The mother of the boy and the girl is arriving soon.
    b. The mother of the boy and the girl are arriving soon.

Why do the verbs in these two sentences have different agreement patterns? Our intuitions tell us that the answer lies in two different possibilities for grouping the words:

(44) a. [The mother of [the boy and the girl]] is arriving soon.
    b. [The mother of the boy] and [the girl] are arriving soon.

The different groupings shown by the brackets indicate who is arriving: in (44a), the mother, while in (44b) it is both the mother and the girl. The grouping of words into larger phrasal units which we call **constituents** provides the first step in understanding the agreement facts in (44).

Now, consider the following examples:

(45) a. John saw the man with a telescope.
    b. I like chocolate cakes and pies.
    c. We need more intelligent leaders.

These sentences have different meanings depending on how we group the words. For example, (45a) will have the following two different constituent structures:

(46) a. John saw [the man with a telescope].
    (the man had the telescope)
    b. John [saw the man] with a telescope].
    (John used the telescope)

Even these very cursory observations indicate that a grammar with only lexical categories is not adequate for describing syntax. In addition, we need a notion of ‘constituent’, and need to consider how phrases may be formed, grouping certain words together.

### 2.4 Phrasal Categories

In addition to the agreement and ambiguity facts, our intuitions may also lead us to hypothesize constituency. If you were asked to group the words in (47) into phrases, what constituents would you come up with?

(47) The student enjoyed his English syntax class last semester.

Perhaps most of us would intuitively assign the structure given in (48a), but not those in (48b) or (48c):

(48) a. [The student] [enjoyed [his English syntax class last semester]].
    b. [The] [student enjoyed] [his English syntax class] [last semester].
c. [The student] [[enjoyed his English] [syntax class last semester]].

What kind of knowledge, in addition to semantic coherence, forms the basis for our intuitions of constituency? Are there clear syntactic or distributional tests which demonstrate the appropriate grouping of words or specific constituencies? There are certain salient syntactic phenomena which refer directly to constituents or phrases.

**Cleft:** The cleft construction, which places an emphasized or focused element in the X position in the pattern ‘It is/was X that . . . ’, can provide us with simple evidence for the existence of phrasal units. For instance, think about how many different cleft sentences we can form from (49).

(49) The policeman met several young students in the park last night.

With no difficulty, we can cleft almost all the constituents we can get from the above sentence:

(50) a. It was [the policeman] that met several young students in the park last night.
   b. It was [several young students] that the policeman met in the park last night.
   c. It was [in the park] that the policeman met several young students last night.
   d. It was [last night] that the policeman met several young students in the park.

However, we cannot cleft sequences that not form constituents:14

(51) a. *It was [the policeman met] that several young students in the park last night.
   b. *It was [several young students in] that the policeman met the park last night.
   c. *It was [in the park last night] that the policeman met several young students.

**Constituent Questions and Stand-Alone Test:** Further support for the existence of phrasal categories can be found in the answers to ‘constituent questions’, which involve a *wh*-word such as who, where, when, how. For any given *wh*-question, the answer can either be a full sentence or a fragment. This stand-alone fragment is a constituent:

(52) A: Where did the policeman meet several young students?
    B: In the park.

(53) A: Who(m) did the policeman meet in the park?
    B: Several young students.

This kind of test can be of use in determining constituents; we will illustrate with example (54):

(54) John put old books in the box.

Are either old books in the box or put old books in the box a constituent? Are there smaller constituents? The *wh*-question tests can provide some answers:

(55) A: What did you put in your box?
    B: Old books.
    B: *Old books in the box.

14The verb phrase constituent *met . . . night* here cannot be clefted for independent reasons (see Chapter 12).
(56) A: What did you put?
B: *Old books.
B: *Old books in the box.

(57) A: What did you do?
B: *Put old books.
B: *Put in the box.
B: Put old books in the box.

Overall, the tests here will show that old books and in the box are constituents, and that put old books in the box is also a (larger) constituent.

The test is also sensitive to the difference between particles and prepositions. Consider the similar-looking examples in (58), including looked and up:

(58) a. John looked up the inside of the chimney.
   b. John looked up the meaning of ‘chanson’.

The examples differ, however, as to whether up forms a constituent with the following material or not. We can again apply the wh-question test:

(59) A: What did he look up?
   B: The inside of the chimney.
   B: The meaning of ‘chanson’.

(60) A: Where did he look?
   B: Up the inside of the chimney.
   B: *Up the meaning of ‘chanson’.

(61) A: Up what did he look?
   B: The inside of the chimney.
   B: *The meaning of ‘chanson’.

What the contrasts here show is that up forms a constituent with the inside of the chimney in (58a) whereas it does not with the meaning of ‘chanson’ in (58b).

**Substitution by a Pronoun**: English, like most languages, has a system for referring back to individuals or entities mentioned by the use of pronouns. For instance, the man who is standing by the door in (62a) can be ‘substituted’ by the pronoun he in (62b).

(62) a. What do you think the man who is standing by the door is doing now?
   b. What do you think he is doing now?

There are other pronouns such as there, so, as, and which, which also refer back to other constituents.

(63) a. Have you been [to Seoul]? I have never been there.
   b. John might [go home], so might Bill.
   c. John might [pass the exam], and as might Bill.
d. If John can [speak French fluently] – which we all know he can – we will have no problems.

A pronoun cannot be used to refer back to something that is not a constituent:

(64) a. John asked me to put the clothes in the cupboard, and to annoy him I really stuffed there [there=in the cupboard].

b. John asked me to put the clothes in the cupboard, and to annoy him I stuffed them there [them=the clothes].

c. *John asked me to put the clothes in the cupboard, but I did so [=put the clothes] in the suitcase.

Both the pronoun there and them refer to a constituent. However, so in (64c), referring to a VP, refers only part of a constituent put the clothes, making it unacceptable.

**Coordination:** Another commonly-used test is coordination. Words and phrases can be coordinated by conjunctions, and each conjunct is typically the same kind of constituent as the other conjuncts:

(65) a. The girls [played in the water] and [swam under the bridge].

b. The children were neither [in their rooms] nor [on the porch].

c. She was [poor] but [quite happy].

d. Many people drink [beer] or [wine].

If we try to coordinate unlike constituents, the results are typically ungrammatical.

(66) a. *Mary waited [for the bus] and [to go home].

b. *Lee went [to the store] and [crazy].

Even though such syntactic constituent tests are limited in certain cases, they are often adopted in determining the constituent of given expressions.

### 2.5 Phrase Structure Rules

We have seen evidence for the existence of phrasal categories. We say that phrases are projected from lexical categories, and hence we have phrases such as NP, VP, PP, and so on. As before, we use distributional evidence to classify each type, and then specify rules to account for the distributions we have observed.

#### 2.5.1 NP: Noun Phrase

Consider (67):

(67) __ [liked ice cream].

The expressions that can occur in the blank position here are once again limited. The kinds of expression that do appear here include:

(68) Mary, I, you, students, the students, the tall students, the students from Seoul, the students who came from Seoul, etc.
If we look into the sub-constituents of these expressions, we can see that each includes at least an N and forms an NP (noun phrase). This leads us to posit the following rule:

\[ \text{NP} \rightarrow (\text{Det}) A^* N (\text{PP/S}) \]

This rule characterizes a phrase, and is one instance of a phrase structure rule (PS rule). The rule indicates that an NP can consist of an optional Det, any number of optional A, an obligatory N, and then an optional PP or a modifying S. The slash indicates different options for the same place in the linear order. These options in the NP rule can be represented in a tree structure:

![Tree structure of NP](image)

Once we insert appropriate expressions into the pre-terminal nodes, we will have well-formed NPs; and the rule will not generate the following NPs:

\[ \text{*the whistle tune, *the easily student, *the my dog, ...} \]

One important point is that as only N is obligatory in NP, a single noun such as Mary, you, or students can constitute an NP by itself. Hence the subject of the sentence She sings will be an NP, even though that NP consists only of a pronoun.

2.5.2 VP: Verb Phrase

Just as N projects an NP, V projects a VP. A simple test environment for VP is given in (72).

\[ \text{The student } \_ \_ \_ . \]

(73) lists just a few of the possible phrases that can occur in the underlined position.

\[ \text{snored, ran, sang, loved music, walked the dog through the park, lifted 50 pounds, thought Tom is honest, warned us that storms were coming, etc.} \]

These phrases all have a V as their head – as projections of V, they form VP. VP can be characterized by the rule in (74), to a first level of analysis:

\[ \text{VP} \rightarrow V (\text{NP}) (\text{PP/S}) \]

This simple VP rule says that a VP can consist of an obligatory V followed by an optional NP and then any number of PPs or an S. The rule thus does not generate ill-formed VPs such as these:

\[ \text{*leave the meeting sing, *the leave meeting, *leave on time the meeting, ...} \]

---

15 The relative clause who came from Seoul is kind of modifying sentence (S). See Chapter 11.
16 To license an example like the very tall man, we need to make A* as AP*. For simplicity, we just use the former in the rule.
We can also observe that the presence of a VP is essential in forming a grammatical S, and the
VP must be finite (present or past tense). Consider the following examples:

(76) a. The monkey wants to leave the meeting.
    b. *The monkey eager to leave the meeting.

(77) a. The monkeys approved of their leader.
    b. *The monkeys proud of their leader.

(78) a. The men practice medicine.
    b. *The men doctors of medicine.

These examples show us that an English well-formed sentence consists of an NP and a (finite)
VP, which can be represented as a PS rule:

(79) \[ S \rightarrow NP \ VP \]

We thus have the rule that English sentences are composed of an NP and a VP, the precise
structural counterpart of the traditional ideas of a sentence being ‘a subject and predicate’ or ‘a
noun and a verb’.

One more aspect to the structure of VP involves the presence of auxiliary verbs. Think of
continuations for the fragments in (80):

(80) a. The students ___.
    b. The students want ___.

For example, the phrases in (81a) and (81b) can occur in (80a) whereas those in (81c) can appear
in (80b).

(81) a. run, feel happy, study English syntax, . . .
    b. can run, will feel happy, must study English syntax, . . .
    c. to run, to feel happy, to study English syntax, . . .

We have seen that the expressions in (81a) all form VPs, but how about those in (81b) and
(81c)? These are also VPs, which happen to contain more than one V. In fact, the parts after
the auxiliary verbs in (81b) and (81c) are themselves regular VPs. In the full grammar we
will consider to and can and so on as auxiliary verbs, with a feature specification [AUX +] to
distinguish them from regular verbs. Then all auxiliary verbs are simply introduced by a second
VP rule:  

(82) \[ VP \rightarrow V[AUX +] \ VP \]

One more important VP structure involves the VP modified by an adverb or a PP:

(83) a. John [[read the book] loudly].
    b. The teacher [[met his students] in the class].

\(^{17}\)The detailed discussion of English auxiliary verbs is found in Chapter 8.

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In such examples, the adverb *loudly* and the PP *in the class* are modifying the preceding VP. To form such VPs, we need the PS rule in (84):

\[(84) \quad \text{VP} \rightarrow \text{VP Adv/PP}\]

This rule, together with (79) will allow the following structure for (83b).\(^{18}\)

\[(85) \quad \text{S} \quad \text{←←←←←←←←←←←}
\quad \text{↑↑↑↑↑↑↑↑↑↑↑}
\quad \text{NP} \quad \text{↙↙↙↙↙↙}
\quad \text{↗↗↗↗↗↗}
\quad \text{VP} \quad \text{←←←←←←←←←←←}
\quad \text{↑↑↑↑↑↑↑↑↑↑↑}
\quad \text{PP} \quad \text{↙↙↙↙↙↙}
\quad \text{↗↗↗↗↗↗}
\quad \text{VP}
\quad \text{met his students}
\quad \text{in the class}\]

### 2.5.3 AP: Adjective Phrase

The most common environment where an adjective phrase (AP) occurs is in ‘linking verb’ constructions as in (86):

\[(86) \quad \text{John feels _ .}\]

Expressions like those in (87) can occur in the blank space here:

\[(87) \quad \text{happy, uncomfortable, terrified, sad, proud of her, proud that he passed the exam, etc.}\]

Since these all include an adjective (A), we can safely conclude that they all form an AP. Looking into the constituents of these, we can formulate the following simple PS rule for the AP:

\[(88) \quad \text{AP} \rightarrow A \ (\text{PP/VP/S})\]

This simple AP rule can easily explain the following contrast:

\[(89) \quad \begin{align*}
\text{a.} & \quad \text{John sounded happy/uncomfortable/terrified/proud of her.} \\
\text{b.} & \quad \text{John sounded *happily*/very*/the student/*in the park.}
\end{align*}\]

Also observe the contrasts in these examples:

\[(90) \quad \begin{align*}
\text{a.} & \quad \text{*The monkeys seem [want to leave the meeting].} \\
\text{b.} & \quad \text{The monkeys seem [eager to leave the meeting].}
\end{align*}\]

\[(91) \quad \begin{align*}
\text{a.} & \quad \text{*John seems [know about the bananas].} \\
\text{b.} & \quad \text{John seems [certain about the bananas].}
\end{align*}\]

These examples tell us that the verb *seem* combines with an AP, but not with a VP.

### 2.5.4 AdvP: Adverb Phrase

Another phrasal syntactic category is adverb phrase (AdvP), as exemplified in (92).

\(^{18}\)We use a triangle when we need not represent the internal structure of a phrase.
soundly, well, clearly, extremely, carefully, very soundly, almost certainly, very slowly, etc.

These phrases are often used to modify verbs, adjectives, and adverbs themselves, and they can all occur in principle in the following environments:

(93)  
   a. He behaved very _.
   b. They worded the sentence very _.
   c. He treated her very _.

Phrases other than an AdvP cannot appear here. For example, an NP the student or AP happy cannot occur in these syntactic positions. Based on what we have seen so far, the AdvP rule can be given as follows:

(94) AdvP → (AdvP) Adv

2.5.5 PP: Preposition Phrase

Another major phrasal category is preposition phrase (PP). PPs like those in (95), generally consist of a preposition plus an NP.

(95) from Seoul, in the box, in the hotel, into the soup, with John and his dog, under the table, etc.

These PPs can appear in a wide range of environments:

(96)  
   a. John came from Seoul.
   b. They put the book in the box.
   c. They stayed in the hotel.
   d. The fly fell into the soup.

One clear case in which only a PP can appear is the following:

(97) The squirrel ran straight/right _.

The intensifiers straight and right can occur neither with an AP nor with an AdvP:

(98)  
   a. The squirrel ran straight/right up the tree.
   b. *The squirrel is straight/right angry.
   c. *The squirrel ran straight/right quickly.

From the examples in (95), we can deduce the following general rule for forming a PP:

(99) PP → P NP

The rule states that a PP consists of a P followed by an NP. We cannot construct unacceptable PPs like the following:

---

19 Depending on how we treat the qualifier straight and right, we may need to extend this PP rule as “PP → (Qual) P NP” so that the P may be preceded by an optional qualifier like right or straight. However, this means, we need to introduce another lexical category ‘Qual’. Another direction is to take the qualifier categorically as an adverb carrying the feature QUAL while allowing only such adverbs to modify a PP.
2.6 Grammar with Phrases

We have seen earlier that the grammar with just lexical categories is not adequate for capturing the basic properties of the language. How much further do we get with a grammar which includes phrases? A set of PS rules, some of which we have already seen, is given in (101). 20

\[
\begin{align*}
\text{(101) a. } & S \rightarrow \text{NP VP} \\
\text{b. } & \text{NP } \rightarrow (\text{Det}) \text{ A* N (PP/S)} \\
\text{c. } & \text{VP } \rightarrow \text{V (NP) (PP/S/VP)} \\
\text{d. } & \text{AP } \rightarrow \text{A (PP/S)} \\
\text{e. } & \text{AdvP } \rightarrow (\text{AdvP}) \text{ Adv} \\
\text{f. } & \text{PP } \rightarrow \text{P NP}
\end{align*}
\]

The rules say that a sentence is the combination of NP and VP, and an NP can be made up of a Det, any number of As, an obligatory N, and any number of PPs, and so on.. Of the possible tree structures that these rules can generate, the following is one example:

\[
\begin{align*}
\text{(102) } & S \\
& \quad \text{NP} \quad \text{VP} \\
& \quad \quad \text{Det} \quad \text{A} \quad \text{N} \quad \text{V} \quad \text{NP} \quad \text{PP} \\
& \quad \quad \quad \quad \quad \text{Det} \quad \text{N} \quad \text{P} \quad \text{NP} \\
& \quad \quad \quad \quad \quad \quad \quad \quad \quad \text{Det} \quad \text{N}
\end{align*}
\]

With the structural possibilities shown here, let us assume that we have the following lexical entries:

\[
\begin{align*}
\text{(103) a. } & \text{Det: a, an, this, that, any, some, which, his, her, no, etc.} \\
\text{b. } & \text{A: handsome, tall, fat, large, dirty, big, yellow, etc.} \\
\text{c. } & \text{N: book, ball, hat, friend, dog, cat, man, woman, John, etc.} \\
\text{d. } & \text{V: kicked, chased, sang, met, believed, thinks, imagines, assumes etc.}
\end{align*}
\]

20The grammar consisting of such form of rules is often called a ‘Context Free Grammar’, as each rule may apply any time its environment is satisfied, regardless of any other contextual restrictions.
Inserting these elements in the appropriate pre-terminal nodes (the places with dots) in (102), we are able to generate various sentences like those in (104):^{21}

(104)  a. This handsome man chased a dog.
       b. A man kicked that ball.
       c. That tall woman chased a cat.
       d. His friend kicked a ball.

There are several ways to generate an infinite number of sentences with this kind of grammar. As we have seen before, one simple way is to repeat a category like A infinitely. There are also other ways of generating an infinite number of grammatical sentences. Look at the following two PS rules from (101) again:

(105) a. S → NP VP
     b. VP → V S

As we show in the following tree structure, we can ‘recursively’ apply the two rules, in the sense that one can feed the other, and then vice versa:

(106)  [Diagram of tree structure with recursive application of S → NP VP and VP → V S]

It is not difficult to expand this sentence by applying the two rules again and again:

(107) a. Bill claims John believes Mary thinks Tom is honest.
       b. Jane imagines Bill claims John believes Mary thinks Tom is honest.

There is no limit to this kind of recursive application of PS rules: it proves that this kind of grammar can generate an infinite number of grammatical sentences.

One structure which can be also recursive involves sentences involving auxiliary verbs. As noted before in (84), an auxiliary verb forms a larger VP after combining with a VP:

^{21}The grammar still generates semantically anomalous examples like # The desk believed a man or # A man sang her hat. For such semantically distorted examples, we need to refer to the notion of ‘selectional restrictions’ (see Chapter 7).
This means that we will also have a recursive structure like the following:

Another important property that PS rules bring is the ability to make reference to hierarchical structures within given sentences, where parts are assembled into sub-structures of the whole. One merit of such hierarchical structural properties is that they enable us to represent the structural ambiguities of sentences we have seen earlier in (45). Let us look at more examples:

110  a. The little boy hit the child with a toy.
    b. Chocolate cakes and pies are my favorite desserts.

Depending on which PS rules we apply, for the sentences here, we will have different hierarchical tree structures. Consider the possible partial structures of (110a) which the grammar can generate:

---

22Due to the limited number of auxiliary verbs, and restrictions on their cooccurrence, the maximum number of auxiliaries in a single English clause is 3.

23One can draw a slight different structure for (111b) with the introduction of the rule ‘NP → NP PP’.
The structures clearly indicate what *with the toy* modifies: in (111a), it modifies the whole VP phrase whereas (111b) modifies just the noun *child*. The structural differences induced by the PS rules directly represent these meaning differences.

In addition, we can easily show why examples like the following are not grammatical:

(112)  

a. *The children were in their rooms or happy.

b. *Lee went to the store and crazy.

We have noted that English allows two alike categories to be coordinated. This can be written as a PS rule, for phrasal conjunction, where XP is any phrase in the grammar.

(113)  

XP → XP* Conj XP

The rule says two identical XP categories can be coordinated and form the same category XP. Applying this PS rule, we will then allow (114a) but not (114b):

(114)  

a.  

b.  

Unlike categories such as PP and AP may not be coordinated.

The PS rules further allow us to represent the difference between phrasal verb (verb and particle) constructions and prepositional verb (verb and prepositional) constructions, some of whose properties we have seen earlier. Consider a representative pair of contrasting examples:

(115) a. John suddenly got off the bus.
    b. John suddenly put off the customers.

By altering the position of off, we can determine that off in (115a) is a preposition whereas off in (115b) is a particle:

(116) a. *John suddenly got the bus off.
    b. John suddenly put the customers off.

This in turn means that off in (115a) is a preposition, forming a PP with the following NP, whereas off in (115b) is a particle that forms no constituent with the following NP the customers. This in turn means that in addition to the PP formation rule, the grammar needs to introduce the following VP rule:

(117) VP $\rightarrow$ V (Part) (NP) (Part) PP

Equipped with this rule, we then can easily represent the differences of these grammatical sentences in tree structures:

(118) a. 

```
  VP
  └── V
      └── get

  └── PP
      └── NP
          └── the bus

   └── off
```

b. 

```
  VP
  └── V
      └── put

  └── Part
      └── NP
          └── the customers

   └── off
```

c. 

```
  VP
  └── V
      └── put

  └── NP
      └── the customers

  └── Part
      └── off
```
As represented here, the particle does not form a constituent with the following or preceding NP whereas the preposition does form a constituent with it.

In summary, we have seen that a grammar with lexical categories can not only generate an infinite number of grammatical English sentences, it does account for some fundamental properties, such as agreement and constituency. This motivates the introduction of phrases into the grammar.

2.7 Exercises

1. Discuss the categorial status of each of the words in the following sentences, giving detailed reasons (based on meaning, form, or function) in support of your analysis.
   (i) a. Oil companies will have to pass on all of the benefits of tax reform to the consumer.
       b. Attached to the plastic frame is a mesh covering that will prevent a child from rolling off of the bed onto the floor.

2. Consider the lexical category status of italicised *nonsense words* in the following sentences and provide arguments in support of your analysis.
   (i) a. John *blonks* on Sundays.
       b. John likes to *blonk* in the afternoons.
       c. John was feeling *murgy*, but happy.
       d. He’s *murgier* than anyone I know.
       e. John is a *garoon*, and so is Fred.
       f. In fact, they’re both typical *garoons*.
       g. She put the car *ong* the garage.
       h. She made sure that it was right *ong*.

3. Determine the lexical category of *for* and *that* in the following examples and decide what kind of PS rule(s) we need to account for them.
   (i) a. It is important *for* us to spend time with children.
       b. He was arrested *for* being drunk.
       c. I think *that* person we met last week is insane.
       d. We believe *that* he is quite reasonable.
       e. I forgot to return the book *that* I borrowed from the teacher.

---

24 In this chapter, we have not discussed the treatment of agreement with PS rules. Chapter 6 discusses the subject-verb agreement in detail.
25 This exercise is adopted from Radford (1988).
4. Consider the following data carefully and describe the similarities and differences among *that, for, if* and *whether*. In so doing, first compare *that* and *for* and then see how these two are different from *if* and *whether*. Finally, see how *if* and *whether* are similar or different from *wh*-words like *what* and *where*.

(i) a. I am anxious that you should arrive on time.
   b. *I am anxious that you to arrive on time.
(ii) a. I am anxious for you to arrive on time.
   b. *I am anxious for you should arrive on time.
(iii) a. I don’t know whether/if I should agree.
   b. I wonder whether/if you’d be kind enough to give us information.
(iv) a. I don’t know whether/*if to agree.
   b. I don’t know *that to agree.
   c. I don’t know what to do.
   d. I don’t know where to go.
(v) a. I am not certain about when he will come.
   b. I am not certain about whether he will go or not.
   c. I am not certain about *if he will go or not.
(vi) a. If students study hard, teachers will be happy.
   b. Whether they say it or not, most teachers expect their students to study hard.

5. Draw trees for the following sentences and see with which phrase each of the italicized phrases forms a constituent. In supporting its constituenthood, do at least two constituenthood tests (e.g., cleft, pronoun substitution, stand-alone, etc).

(ii) a. She turned down the side street.
   b. She turned down his offer.
(iii) a. He looked at a book about swimming.
   b. He talked to a girl about swimming.

6. Explain why the examples in (i) are ungrammatical. Do this by drawing trees for each sentence while referring to the PS rules related to particles and coordination.

(i) a. *Could you turn off the fire and on the light?*
   b. *A nuclear explosion would wipe out plant life and out animal life.*
   c. *He ran down the road and down the President.*
   d. *I know the truth and that you are innocent.*
   e. *Lee went to the store and crazy.*

7. Provide a tree structure for each of the following sentences and suggest what kind of rules for VP will be necessary. In doing so, pay attention to the position of modifiers like
proudly, by the park, and so forth.

(i) a. John refused the offer proudly.
   b. I consider Telma the best candidate.
   c. I saw him leaving the main building.
   d. He took Masako to the school by the park.
   e. John sang a song and danced to the music.
   f. John wants to study linguistics in near future.
   g. They told Angelica to arrive early for the award.
   h. That Louise had abandoned the project surprised everyone.

8. Each of the following sentences is structurally ambiguous. Represent their structural ambiguities by providing different tree structures for each string of words.

(i) a. I know you like the back of my hand.
   b. I forgot how good beer tastes.
   c. I saw that gas can explode.
   d. Time flies like an arrow.
   e. I need to have that report on my desk by tomorrow.

9. Provide tree structures for each of the following sentences. See if there are any PS rules that we need to introduce.

(i) Different languages may have different lexical categories, or they might associate different properties to the same one. For example, Spanish uses adjectives almost interchangeably as nouns while English cannot. Japanese has two classes of adjectives where English has one; Korean, Japanese, and Chinese have measure words while European languages have nothing resembling them; many languages don’t have a distinction between adjectives and adverbs, or adjectives and nouns, etc. Many linguists argue that the formal distinctions between parts of speech must be made within the framework of a specific language or language family, and should not be carried over to other languages or language families.26

Syntactic Forms, Grammatical Functions, and Semantic Roles

3.1 Introduction

In the previous chapter, we analyzed English sentences with PS rules. For example, the PS rule ‘S → NP VP’ represents the basic rule for forming well-formed English sentences. As we have seen, such PS rules allow us to represent the constituent structure of a given sentence in terms of lexical and phrasal syntactic categories. There are other dimensions of the analysis of sentences; one such way is using the notion of grammatical functions such as subject and object:

2. Grammatical functions: SUBJ (Subject), OBJ (Object), MOD (Modifier), PRED (Predicate), . . .

The notions such as SUBJ, OBJ and PRED represent the grammatical function each constituent plays in the given sentence. For example, consider one simple sentence:

(2) The monkey kicked a boy on Monday.

This sentence can structurally represented in terms of either syntactic categories or grammatical functions as in the following:

3. a. [S [NP The monkey] [VP kicked [NP a boy] [PP on Monday]]].
   b. [S [SUBJ The monkey] [PRED kicked [OBJ a boy] [MOD on Monday]]].

As shown here, the monkey is an NP in terms of its syntactic form, but is the SUBJ (subject) in terms of its grammatical function. The NP a boy is the OBJ (object) while the verb kicked functions as a predicator. More importantly, we consider the entire VP to be a PRED (predicate) which describes a property of the subject. On Monday is a PP in terms of its syntactic category, but serves as a MOD (modifier) here.

We also can represent sentence structure in terms of semantic roles. Constituents can be considered in terms of conceptual notions of semantic roles such as agent, patient, location,
instrument, and the like. A semantic role denotes the underlying relationship that a participant has with the relation of the clause, expressed by the main verb. Consider the semantic roles of the NPs in the following two sentences:\(^{27}\)

\[
(4) \quad \begin{align*}
&\text{a. John tagged the monkey in the forest.} \\
&\text{b. The monkey was tagged in the forest by John.}
\end{align*}
\]

Both of these sentences describe a situation in which someone named John tagged a particular monkey. In this situation, John is the agent and the monkey is the patient of the tagging event. This in turn means that in both cases, John has the semantic role of agent (agt), whereas the monkey has the semantic role of patient (pat), even though their grammatical functions are different. We thus can assign the following semantic roles to each constituent of the examples:

\[
(5) \quad \begin{align*}
&\text{a. }[[\text{agt John} ][\text{pred tagged } \text{pat the monkey} ][\text{loc in the forest}]]. \\
&\text{b. }[[\text{pat The monkey} ][\text{pred was tagged } \text{loc in the wood} ][\text{agt by John}]].
\end{align*}
\]

As noted here, in addition to agt (agent) and pat (patient), we have has pred (predicate) and loc (loative) semantic roles that express the semantic role that each expression performs in the described situation.

Throughout this book we will see that English grammar refers to these three different levels of information (syntactic category, grammatical function, and semantic role), and they interact with each other. For now, it may appear that they are equivalent classifications: for example, an agent is a subject and an NP, and a patient is an object and an NP. However, as we get further into the details of the grammar, we will see many ways in which the three levels are not simply co-extensive.

### 3.2 Grammatical Functions

How can we identify the grammatical function of a given constituent? Several tests can be used to determine grammatical function, as we show here.

#### 3.2.1 Subjects

Consider the following pair of examples:

\[
(6) \quad \begin{align*}
&\text{a. }[\text{The cat}][\text{devoured } \text{the rat}]. \\
&\text{b. }[\text{The rat}][\text{devoured } \text{the cat}].
\end{align*}
\]

These two sentences have exactly the same words and have the same **predicate** devoured. Yet they are significantly different in meaning, and the main difference comes from what serves as **subject** or **object** with respect to the **predicate**. In (6a), the subject is the cat, whereas in (6b) it is the rat, and the object is the rat in (6a) but the cat in (6b).

The most common structure for a sentence seems to be one in which the NP subject is the one who performs the action denoted by the verb (thus having the semantic role of agent). However,

\(^{27}\)Semantic roles are also often called ‘thematic roles’ or ‘\(\theta\)-roles (“theta roles”) in generative grammar (Chomsky 1982, 1986).
this is not always so:

(7)  
    a. My brother wears a green overcoat.
    b. This car stinks.
    c. It rains.
    d. The committee disliked her proposal.

Wearing a green overcoat, stinking, raining, or disliking one’s proposal are not agentive activities; they indicate stative descriptions or situations. Such facts show that we cannot rely on the semantic roles of agent for determining subjecthood.

More reliable tests for subjecthood come from syntactic tests such as agreement, tag questions, and subject-auxiliary inversion.

**Agreement:** The main verb of a sentence agrees with the subject in English:

(8)  
    a. She never writes/*write home.
    b. These books *saddens/sadden me.
    c. Our neighbor takes/*take his children to school in his car.

As we noted in Chapter 1, simply being closer to the main verb does not entail subjecthood:

(9)  
    a. The book, including all the chapters in the first section, is/*are very interesting.
    b. The effectiveness of teaching and learning *depend/depends on several factors.
    c. The tornadoes that tear through this county every spring *is/are more than just a nuisance.

The subject in each example is book, effectiveness, and tornadoes respectively, even though there are nouns closer to the main verb. This indicates that it is not simply the linear position of the NP that determines agreement; rather, agreement shows us what the subject of the sentence is.

**Tag questions:** A tag question, a short question tagged onto the end of an utterance, is also a reliable subjecthood test:

(10)  
    a. The lady singing with a boy is a genius, isn’t she/*isn’t he?
    b. With their teacher, the kids have arrived safely, haven’t they/*hasn’t he?

The pronoun in the tag question agrees with the subject in person, number, and gender – it refers back to the subject, but not necessarily to the closest NP, nor to the most topical one. The she in (10a) shows us that lady is the head of the subject NP in that example, and they in (10b) leads us to assign the same property to kids. The generalization is that a tag question must contain a pronoun which identifies the subject of the clause to which the tag is attached.

**Subject-auxiliary inversion:** In forming questions and other sentence-types, English has subject-auxiliary inversion, which applies only to the subject.
(11)  a. This teacher is a genius.
      b. The kids have arrived safely.
      c. It could be more detrimental.

(12)  a. Is this teacher a genius?
      b. Have the kids arrived safely?
      c. Could it be more detrimental?

As seen here, the formation of ‘Yes/No questions’ such as these involves the first tensed auxiliary verb moving across the subject: more formally, the auxiliary verb is inverted with respect to the subject, hence the term ‘subject-auxiliary inversion’. This is not possible with a non-subject:

(13)  a. The kids in our class have arrived safely.
      b. *Have in our class the kids arrived safely?

Subject-auxiliary inversion provides another reliable subjecthood test.

3.2.2 Direct and Indirect Objects

A direct object (DO) is canonically an NP, undergoing the process denoted by the verb:

(14)  a. His girlfriend bought this computer.
      b. That silly fool broke the teapot.

However, this is not a solid generalization. The objects in (15a) and (15b) are not really affected by the action. In (15a) the dog is experiencing something, and in (15b) the thunder is somehow causing some feeling in the dog:

(15)  a. Thunder frightens [the dog].
      b. The dog fears [thunder].

Once again, the data show us that we cannot identify the object based on semantic roles. A much more firm criterion is the syntactic construction of passivization, in which a notional direct object appears as subject. The sentences in (16) can be turned into passive sentences in (17):

(16)  a. His girlfriend bought this computer for him.
      b. The child broke the teapot by accident.

(17)  a. This computer was bought for him by his girlfriend.
      b. The teapot was broken by the child by accident.

What we can notice here is that the objects in (16) are ‘promoted’ to subject in the passive sentences. The test comes from the fact that non-object NPs cannot be promoted to the subject:

(18)  a. This item belongs to the student.
      b. *The student is belonged to by this item.

(19)  a. He remained a good friend to me.
      b. *A good friend is remained to me (by him).
The objects that undergo passivization are direct objects, distinct from indirect objects. An indirect object (IO) is one which precedes a direct object (DO), as in (20); IOs are NPs and have the semantic roles of goal, recipient, or benefactive:

(20)  a. I threw [the puppy] [the ball]. (IO = goal)
     b. John gave [the boys] [the CDs]. (IO = recipient)
     c. My mother baked [me] [a birthday cake]. (IO = benefactive)

A caution is in order – when a DO follows an IO as in (20), the DO cannot be passivized:

(21)  a. *The CDs were given the boys by John.
     b. *A review copy of the book was sent her by the publisher.

In examples like (20), passive has the property of making the IO into the subject.

(22)  a. The boys were given the CDs (by John).
     b. She was sent a review copy of the book (by the publisher).

Note that sentences with the IO-DO order are different from those where the semantic role of the IO is expressed as an oblique PP, following the DO:

(23)  a. John gave the CDs to the boys.
     b. The publisher sent a review copy of the book to her.
     c. My mother baked a cake for me.

In this kind of example, it is once again the DO which can be passivized, giving examples like the following:

(24)  a. The CDs were given to the boys by John.
     b. A review copy of the book was sent to her by the publisher.
     c. This nice cake was baked for me by my mother.

### 3.2.3 Predicative Complements

There also are NPs which follow a verb but which do not behave as DOs or IOs. Consider the following sentences:

(25)  a. This is my ultimate goal.
     b. Michelle became an architect.
(26)  a. They elected Graham chairman.
     b. I consider Andrew the best writer

The italicized elements here are traditionally called ‘predicative complements’ in the sense that they function as the predicate of the subject or the object. However, even though they are NPs, they do not passivize:

(27)  a. *Chairman was elected Graham.

---

28Such examples are acceptable in some varieties of (British) English.
b. *The best writer was considered Andrew.

The difference between objects and predicative complements can also be seen in the following contrast:

(28) a. John made Kim a great doll.
    b. John made Kim a great doctor.

Even though the italicized expressions here are both NPs, they function differently. The NP a great doll in (28a) is the direct object, as in John made a great doll for Kim, whereas the NP a great doctor in (28b) cannot be an object: it serves as the predicate of the object Kim. If we think of part of the meaning informally, only in the second example would we say that the final NP describes the NP Kim.

(29) a. (28)a: Kim ≠ a great doll
    b. (28)b: Kim = a great doctor

In addition, phrases other than NPs can serve as predicative complements:

(30) a. The situation became terrible.
    b. This map is what he wants.
    c. The message was that you should come on time.

(31) a. I made Kim angry.
    b. I consider him immoral.
    c. I regard Andrew as the best writer.
    d. They spoil their kids rotten.

The italicized complements function to predicate a property of the subject in (30) and of the object in (31).

3.2.4 Oblique Complements

Consider now the italicized expressions in (32):

(32) a. John put books in the box.
    b. John talked to Bill about the exam.
    c. They would inform Mary of any success they have made.

These italicized expressions are neither objects nor predicative complements. Since their presence is obligatory, for syntactic well-formedness, they are called oblique complements. Roughly speaking, ‘oblique’ contrasts with the ‘direct’ functions of subject and object, and oblique phrases are typically expressed as PPs in English.

As we have seen before, most ditransitive verbs can also take oblique complements:

(33) a. John gave a book to the student.
    b. John bought a book for the student.
    c. John asked Bill of a question.
The PPs here, which cannot be objects since they are not NPs, also do not serve as predicate of the subject or object – they relate directly to the verb, as oblique complements.

### 3.2.5 Modifiers

The functions of DO, IO, predicative complement, and oblique complement all have one common property: they are all selected by the verb, and we view them as being present to ‘complement’ the verb to form a legitimate VP. Hence, these are called **complements (COMPS)**, and typically they cannot be omitted.

Unlike these COMPS, there are expressions which do not complement the predicate in the same way, and which are truly optional:

(34) a. The bus stopped *suddenly*.
    b. Shakespeare wrote his plays *a long time ago*.
    c. They went to the theater *in London*.
    d. He failed chemistry *because he can’t understand it*.

The italicized expressions here are all optional and function as modifiers (also called ‘adjuncts’ or ‘adverbial’ expressions). These modifiers specify the manner, location, time, or reason, among many other properties, of the situations expressed by the given sentences – informally, they are the (how, when, where, and why) phrases.

One additional characteristic of modifiers is that they can be stacked up, whereas complements cannot.

(35) a. *John gave Tom [a book] [a record]*.
    b. I saw this film [several times] [last year] [during the summer].

As shown here, temporal adjuncts like *several times* and *last year* can be repeated, whereas the two complements *a book* and *a record* in (35a) cannot. Of course, temporal adjuncts do not become the subject of a passive sentence, suggesting that they cannot serve as objects.

(36) a. My uncle visited today.
    b. *Today was visited by my uncle*.

### 3.3 Form and Function Together

We now can analyse each sentence in terms of grammatical functions as well as the structural constituents. Let us see how we can analyse a simple sentence along these two dimensions:
As represented here, the expressions *the little cat* and *a mouse* are both NPs, but they have different grammatical functions, SUBJ and OBJ. The VP as a whole functions as the predicate of the sentence, describing the property of the subject.  

Assigning grammatical functions within complex sentences is no different:

Each clause has its own SUBJ and PRED: *John* is the subject of the higher clause, whereas *the cat* is the subject of the lower clause. We also can notice that there are two OBJs: the CP is the object of the higher clause whereas the NP is that of the lower clause.

Every category in a given sentence has a grammatical function, but there is no one-to-one mapping between category such as NP or CP and its possible grammatical function(s). The
following data set shows us how different phrase types can function as SUBJ or OBJ:

(39) a. [NP The termites] destroyed the sand castle.
    b. [VP Being honest] is not an easy task.
    c. [CP That John passed] surprised her.
    d. [VP To finish this work on time] is almost unexpected.
    e. [S What John said] is questionable.
    f. [PP Under the bed] is a safe place to hide.

(40) a. I sent [NP a surprise present] to John.
    b. They wondered [S what she did yesterday].
    c. They believed [CP that everybody would pass the test].
    d. Are you going on holiday before or after Easter? I prefer [PP after Easter].

As the examples in (39) and (40) show, not only NPs but also infinitival VPs and CPs can also function as SUBJ and OBJ. The following tag-question, subject-verb agreement, and subject-hood tests show us that an infinitival VP and CP can function as the subject.

(41) a. [That John passed] surprised her, didn’t it?
    b. [[That the march should go ahead] and [that it should be cancelled]] have been argued by different people at different times.

(42) a. [To finish it on time] would make a quite a statement, is it?
    b. [[To delay the march] and [to go ahead with it]] have been argued by different people at different times.

The same goes for MOD, as noted before. Not only AdvP, but also phrases such as NP, S, VP, or PP can function as a modifier:

(43) a. The little cat devoured a mouse [NP last night].
    b. John left [AdvP very early].
    c. John has been at Stanford [PP for four years].
    d. She disappeared [S when the main party arrived].

The sentence (43a) will have the following structure:

30In due course, we will discuss in detail the properties of each phrase type here.

31The subject clause is canonically categorized as CP. See Chapter 10 and 11 how this S is different from a canonical S too.
The little cat last night devoured a mouse.

Here the expression *last night* is an adverbial NP in the sense that it is categorically an NP but functions as a modifier (adjunct) to the VP.

As we go through this book, we will see that the distinction between grammatical functions and categorical types is crucial in the understanding of English syntax.

### 3.4 Semantic Roles

As noted before, semantic roles were introduced as a way of classifying the arguments of predicates (mostly verbs and adjectives) into a closed set of participant types. Even though we cannot make any absolute generalizations about the relationship between grammatical functions and semantic roles, the properties of semantic roles do interact in regular ways with certain grammatical constructions. A list of the most relevant thematic roles and their associated properties is given below.\(^\text{32}\)

- **Agent**: A participant which the meaning of the verb specifies as doing or causing something, possibly intentionally. Examples: subject of *eat, kick, hit, hammer*, etc.
  
  \(\text{(45)}\)

  a. John ate his noodle quietly.
  
  b. A boy hit the ball.
  
  c. A smith hammered the metal.

- **Patient**: A participant which the verb characterizes as having something happen to it, and as being affected by what happens to it. Examples: object of *kick, hit, hammer*, etc.\(^\text{33}\)
  
  \(\text{(46)}\)

  a. A boy hit the ball.
  
  b. A smith hammered the metal.

- **Experiencer**: A participant who is characterized as aware of something. Examples: subject of perception verbs like *feel, smell, hear, see*, etc.
  
  \(\text{(47)}\)

  a. The students felt comfortable in the class.
  
  b. The student heard a strange sound.

\(\text{32}\)The definition of semantic roles given here is adopted from Dowty (1989).

\(\text{33}\)Patient and theme are often unified into ‘undergoer’ in the sense that both the patient and theme individual undergo the action in question.
• Theme: A participant which is characterized as changing its position or condition, or as being in a state or position. Examples: direct object of give, hand, subject of come, happen, die, etc.

(48) a. John gave a book to the students.
    b. John died last night.

• Benefactive: The entity that benefits from the action or event denoted by the predicator. Examples: oblique complement of make, buy, etc.

(49) a. John made a doll for his son.
    b. John bought a lot of books for his sons.

• Source: The one from which motion proceeds. Examples: subject of promise, object of deprive, free, cure, etc.

(50) a. John promised Bill to leave tomorrow morning.
    b. John deprived his sons of game cards.

• Goal: The one to which motion proceeds. Examples: subject of receive, buy, indirect object of tell, give, etc.

(51) a. Mary received an award from the department.
    b. John told the rumor to his friend.

• Location: The thematic role associated with the NP expressing the location in a sentence with a verb of location. Examples: subject of keep, own, retain, locative PPs, etc.

(52) a. John put his books in the attic.
    b. The government kept all the money.

• Instrument: The medium by which the action or event denoted by the predicator is carried out. Examples: oblique complement of hit, wipe, hammer, etc.

(53) a. John hit the ball with a bat.
    b. John wiped the window with a towel.

An important advantage of having such semantic roles available to us is that it allows us to capture the relationship between two related sentences, as we have already seen. As another example, consider the following pair:

(54) a. [agt The cat] chased [pat the mouse].
    b. [pat The mouse] was chased by [agt the cat].

Even though the above two sentences have different syntactic structures, they have essentially identical interpretations. The reason is that the same semantic roles assigned to the NPs: in both examples, the cat is the agent, and the mouse is the patient. Different grammatical uses of verbs may express the same semantic roles in different arrays.

The semantic roles also allow us to classify verbs into more fine-grained groups. For example, consider the following examples:

(55) a. There still remains an issue to be solved.
b. There lived a man with his grandson.
c. At the same time there arrived a lone guest, a tall, red-haired and incredibly well
dressed man . . . .

(56) a. *There sang a man with a pipe.
b. *There ran a man with an umbrella.

All the verbs are intransitive, but not all are acceptable in the *there*-construction. The dif-
ference can come from the semantic role of the postverbal NP, as assigned by the main verb.
Verbs like *arrive, remain, live* are taken to assign the semantic role of ‘theme’ (see the list of
roles above), whereas verbs like *sing, run* assign an ‘agent’ role. We thus can conjecture that
*there*-constructions do not accept the verb whose subject carries an agent semantic role.

While semantic roles provide very useful ways of describing properties across different con-
structions, we should point out that the theoretical status of semantic roles is still unresolved.34
For example, there is no agreement about exactly which and how many semantic roles are
needed. The problem is illustrated by the following simple examples:

(57) a. John resembles his mother.
b. A is similar to B.

What kind of semantic roles do the arguments here have? Both participants seem to be playing
the same role in these examples – they both cannot be either agent or patient or theme. They are
also cases where we might not be able to pin down the exact semantic role:

(58) a. John runs into the house.
b. Mary looked at the sky.

The subject John in (58a) is both agent and theme: it is agent since it initiates and sustains the
movement but also theme since it is the object that moves.35 Also, the subject Mary in (58b)
can either be an experiencer or an agent depending on her intention – one can just look at the
sky with no purpose at all.36

Even though there are theoretical issues involved in adopting semantic roles in the grammar,
there are also many advantages of using them. We can make generalizations about the grammar
of the language: typically the ‘agent’ takes the subject position, while an NP following the
word *from* is serving as the ‘source’. As we will see in the next chapter, semantic roles are
also recognized as the standard concepts used for organizing predicate-argument structures for
predicates within the lexicon. In the subsequent chapters, we will refer to semantic roles in
various places.

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34See Levin and Rappaport Hovav (2005) for further discussion of this issue.
35Jackendoff (1987) develops an account of thematic roles in which agency and motion are two separate dimensions,
so, in fact, a single NP can be agent and theme.
36To overcome the problem of assigning a right semantic role to an argument, one can assume that each predicator
has its own (individual) semantic roles. For example, the verb *kick*, instead of having an agent and a patient, has two
3.5 Exercises

1. Draw tree structures for the following sentences and then assign the appropriate grammatical function to each phrase.
   (i) a. You will need comprehensive travel insurance.
       b. In the summer we always go to France.
       c. Benny worked in a shoe factory when he was a student.
       d. Last year I saw this film several times.
       e. He baked Tom the bread last night.
       f. That they have completed the course is amazing.
       g. Under the table is a good place to hide.
       h. This poem was written by my uncle.
       i. The film next week is about marine life.
       j. She passed through sheer hard work.

2. Consider the following examples:
   (i) a. There is/are only one chemical substance involved in nerve transmission.
       b. There *is/are more chemical substances involved in nerve transmission.

   With respect to the grammatical function of there, what can we infer from these data? Try out more subjecthood tests, to determine the grammatical function of there in these examples. In addition, think of the following ‘locative inversion’ examples and decide the subject of the sentence.
   (ii) a. In the garden stands/stand a statute.
       b. Among the guests was/were sitting my friend.

3. Construct sentences containing the following grammatical functions:
   (i) a. subject, predicator, direct object
       b. subject, predicator, direct object, indirect object
       c. subject, predicator, adjunct
       d. adjunct, subject, predicator
       e. adjunct, subject, predicator, direct object
       f. subject, predicator, direct object, oblique complement
       g. subject, predicator, predicative complement
       h. subject, predicator, direct object, predicative complement
       i. subject, predicator, predicative complement, adjunct
       j. subject, predicator, direct object, predicative complement, adjunct

4. Give the grammatical function of the italicized phrases in the following examples:
   (i) a. All of his conversation was reported to me.
       b. Sandy removed her ballet shoes.
       c. The school awarded a few of the girls in Miss Kim’s class scholarships.
d. She was the nicest teacher in the Senior School.
e. They elected him America’s 31st President.
f. The next morning we set out for Seoul.
g. Doing syntax is not easy.
h. Why don’t you promise to see him later?
i. This is the place to go to.
j. He saw the man with the stick.
k. This week will be a difficult one for us.
l. We need to finish this project this week.

5. Assign a semantic role to each argument in the following sentences.

(i) a. A big green insect flew into the soup.
   b. John’s mother sent a letter to Mary.
   c. John smelled the freshly baked bread.
   d. We placed the cheese in the refrigerator.
   e. Frank threw himself into the sofa.
   f. The crocodile devoured the doughnut.
   g. John came from Seoul.
   h. John is afraid of Bill.
   i. The ice melted.
   j. The vacuum cleaner terrifies the child.

6. After reading the following texts, circle the ‘agent’, underline the ‘patient’, and box the ‘theme’ expression.

(i) Scientists found that the birds sang well in the evenings, but performed badly in the mornings. After being awake several hours, however, the young males regained their mastery of the material and then improved on the previous day’s accomplishments. To see whether this dip in learning was caused by the same kind of pre-coffee fog that many people feel in the morning, the researchers prevented the birds from practicing first thing in the morning. They also tried keeping the birds from singing during the day, and they used a chemical called melatonin to make the birds nap at odd times. The researchers conclude that their study supports the idea that sleep helps birds learn. Studies of other animals have also suggested that sleep improve learning.37

37From Science News Online, Feb 2, 2007
Head, Complements, and Modifiers

4.1 Projections from Lexical Heads to Phrases

4.1.1 Internal vs. External Syntax

As we have seen in the previous chapters, both syntactic categories (NP, AP, VP, PP, etc.) and grammatical functions (subject, complement, and modifier) play important roles in the analysis of English sentences. We have also observed that the grammatical function and form of each constituent depend on where it occurs or what it combines with.

The combinatory properties of words and phrases involve two aspects of syntax: internal and external syntax. Internal syntax deals with how a given phrase itself is constructed in a well-formed manner whereas external syntax is concerned with how a phrase can be used in a larger construction. Observe the following examples:

(1) a. *John [put his gold].
    b. *John [put under the bathtub].
    c. *John [put his gold safe].
    d. *John [put his gold to be under the bathtub].
    e. John [put his gold under the bathtub].

Why is only (1e) acceptable? Simply, because only it satisfies the condition that the verb put selects an NP and a PP as its complements, and it combines with them in the VP. In the other examples, this condition is not fulfilled. This combinatory requirement starts from the internal (or lexical) properties of the verb put, and is not related to any external properties of the VP.

In contrast, the external syntax is concerned with the external environment in which a phrase occurs. Some of the unacceptable examples in (1) can be legitimate expressions if they occur in the proper (syntactic) context.

(2) a. This is the box in which John [put his gold]. (cf. (1a))
    b. This is the gold that John [put under the bathtub]. (cf. (1b))

The terms ‘internal’ and ‘external’ syntax are from Baker (1995).
Meanwhile, the well-formed VP in (1e) can be unacceptable, depending on external contexts. For example, consider frame induced by the governing verb kept in (3):

(3) a. *The king kept [put his gold under the bathtub].
    b. The king kept [putting his gold under the bathtub].

The VP put his gold under the bathtub is a well-formed phrase, but cannot occur in (3a) since this is not the environment where such a finite VP occurs. That is, the verb kept requires the presence of a gerundive VP like putting his gold under the bathtub, and therefore imposes an external constraint on VPs.

4.1.2 Notion of Head, Complements, and Modifiers

One important property we observe in English phrase-internal syntax is that in building up any phrase, there is one obligatory element in each phrase. That is, each phrase has one essential element as represented in the diagrams in (4):

(4) a. NP b. VP c. AP
    ... N V ... A ...

The circled element here is the essential, obligatory element within the given phrase. We call this essential element the head of the phrase. The head of each phrase thus determines its ‘projection’ into a larger phrasal constituent. The head of an NP is thus N, the head of a VP is V, and the head of an AP is A.

The notion of headedness plays an important role in the grammar. For example, the verb put, functioning as the head of a VP, dictates what it must combine with – two complements, NP and PP. Consider other examples:

(5) a. The defendant denied the accusation.
    b. *The defendant denied.

(6) a. The teacher handed the student a book.
    b. *The teacher handed the student.

The verb denied here requires an NP object whereas handed requires two NP complements, in this use. The properties of the head verb itself determine what kind of elements it will combine with. As noted in the previous chapter, the elements which a head verb should combine with are called complements. The complements include direct object, indirect object, predicative complement, and oblique complement since these are all potentially required by some verb or other.

The properties of the head become properties of the whole phrase. Why are the examples in (7b) and (8b) ungrammatical?

39See section 1.3 in Chapter 1 also.
(7)  a. They [want to leave the meeting].
  b. *They [eager to leave the meeting].

(8)  a. The senators [know that the president is telling a lie].
  b. *The senators [certain that the president is telling a lie].

The examples in (7b) and (8b) are unacceptable because of the absence of the required head. The unacceptable examples lack a finite (tensed) VP as the bracketed part, but we know that English sentences require a finite VP as their immediate constituent, as informally represented as in (9):

(9)  **English Declarative Sentence Rule:**
    Each declarative sentence must contain a finite VP.

Each finite VP is headed by a finite verb. If we amend the ungrammatical examples above to include a verb but not a finite one, they are still ungrammatical:

(10)  a. *They [(to) be eager to leave the meeting].
  b. *The senators [(to) be certain that the president is telling a lie].

The VP is considered to be the (immediate) head of the sentence, with the verb itself as the head of the VP. In this way, we can talk about a finite or non-finite sentence, one which is ultimately headed by a finite or nonfinite verb, respectively.\(^{40}\)

In addition to the complements of a head, a phrase may also contain **modifiers**:

(11)  a. Tom [VP [VP offered advice to his students] \textit{in his office}].
  b. Tom [VP [VP offered advice to his students] \textit{with love}].

The PPs \textit{in his office} or \textit{with love} here provide further information about the action described by the verb, but are not required as such by the verb. These phrases are optional and function as modifiers, and they function to augment the minimal phrase projected from the head verb \textit{offered}. The VP which includes this kind of modifier forms a **maximal phrase**. We might say that the inner VP here forms a ‘minimal’ VP which includes all the ‘minimally’ required complements, and the outer VP is the ‘maximal’ VP which includes optional modifiers.

What we have seen can be summarized as follows:

(12)  a. **Head**: A lexical or phrasal element that is essential in forming a phrase.
  b. **Complement**: A phrasal element that a head must combine with or a head select.
    These include direct object, indirect object, predicative complement, and oblique complement.
  c. **Modifier**: A phrasal element not selected by the verb functions as a modifier to the head phrase.
  d. **Minimal Phrase**: A minimal phrase is the phrase including this head and all of its complements.

\(^{40}\)See section ?? of Chapter 5 for the detailed discussion of English verb form (VFORM) values including finite and nonfinite.
e. **Maximal Phrase**: A XP (VP/NP/AP) that includes complements as well as modifiers.

### 4.2 Differences between Complements and Modifiers

Given these notions of complements and modifiers, the question that then follows is how we can distinguish between complements and modifiers. There are several tests to determine whether a phrase is a complement or a modifier.\(^{41}\)

**Obligatoryness**: As hinted at already, complements are strictly-required phrases whereas modifiers are not. The examples in (13)–(15) show that the verb *placed* requires an NP and a PP as its complements, *kept* an NP and an AP, and *stayed* a PP.

\[\begin{align*}
(13) & \quad a. \text{John placed Kim behind the garage.} \\
& \quad b. \text{John kept him behind the garage.} \\
& \quad c. \text{*John stayed Kim behind the garage.}
\end{align*}\]

\[\begin{align*}
(14) & \quad a. \text{*John placed him busy.} \\
& \quad b. \text{John kept him busy.} \\
& \quad c. \text{*John stayed him busy.}
\end{align*}\]

\[\begin{align*}
(15) & \quad a. \text{*John placed behind the counter.} \\
& \quad b. \text{*John kept behind the counter.} \\
& \quad c. \text{John stayed behind the counter.}
\end{align*}\]

In contrast, modifiers are optional. Their presence is not required by the grammar:

\[\begin{align*}
(16) & \quad a. \text{John deposited some money in the bank.} \\
& \quad b. \text{John deposited some money in the bank on Friday.}
\end{align*}\]

In (16b), the PP *on Friday* is optional here, serving as a modifier.

**Iterability**: The possibility of iterating identical types of phrase can also distinguish between complements and modifiers. In general two or more instances of the same modifier type can occur with the same head, but this is impossible for complements.

\[\begin{align*}
(17) & \quad a. \text{*The UN blamed global warming [on humans] [on natural causes].} \\
& \quad b. \text{Kim and Sandy met [in Seoul] [in the lobby of the Lotte Hotel] in March.}
\end{align*}\]

In (17a) *on humans* is a complement and thus the same type of PP *on natural causes* cannot co-occur. Yet *in Seoul* is a modifier and we can repeatedly have the same type of PP.

\(^{41}\)Most of the criteria we discuss here are adopted from Pollard and Sag (1987).
**Do-so Test**: Another reliable test often used to distinguish complements from modifiers is the *do so* or *do the same thing* test. As shown in (18), we can use *do the same thing* to avoid repetition of an identical VP expression:

(18) a. John deposited some money in the checking account and Mary did the same thing (too).
   b. John deposited some money in the checking account on Friday and Mary did the same thing (too).

What we can observe in (18b) is that the VP *did the same thing* can replace either the minimal phrase *deposited some money in the checking account* or the maximal phrase including the modifier *on Friday*. Notice that this VP can replace only the minimal phrase, leaving out the modifier.

(19) John deposited some money in the checking account on Friday and Mary did the same thing on Monday.

From these observations, we can draw the conclusion that if something can be replaced by *do the same thing*, then it is either a minimal or a maximal phrase. This in turn means that this ‘replacement’ VP cannot be understood to leave out any complement(s). This can be verified with more data:

(20) a. *John [deposited some money in the checking account] and Mary did the same thing in the savings account.
   b. *John [gave a present to the student] and Mary did the same thing to the teacher.

Here the PPs *in the checking account* and *to the student* are both complements, and thus they should be included in the *do the same thing* phrase. This gives us the following informal generalization:

(21) **Do-so Replacement Condition:**

The phrase *do so* or *do the same thing* can replace a verb phrase which includes at least any complements of the verb.

This condition explains why we cannot have another locative complement phrase *in the savings account* or *to the teacher* in (20). The unacceptability of the examples in (22) also supports this generalization about English grammar:

(22) a. *John locked Fido in the garage and Mary did so in the room.
   b. *John ate a carrot and Mary did so a radish.

**Constancy of semantic contribution**: An adjunct can cooccur with a relatively broad range of heads whereas a complement is typically limited in its distribution. Note the following contrast:

(23) a. Kim camps/jogs/mediates on the hill.
b. Kim jogs on the hill/under the hill/over the hill.

(24) a. Kim depends/relies on Sandy.
   b. Kim depends on Sandy/*at Sandy/*for Sandy.

The semantic contribution of the adjunct on the hill in (23a) is independent of the head whereas that of the complement on Sandy is idiosyncratically dependent upon the head.

**Structural Difference:** We could distinguish complements and modifiers by tree structures, too: complements combine with a lexical head (not a phrase) to form a minimal phrase whereas modifiers combine with a phrase to form a maximal phrase. This means that we have structures of the following forms:

(25) \[
\begin{array}{c}
XP \\
\downarrow \\
XP \\
\downarrow \\
X \quad \text{Modifier} \\
\downarrow \\
\text{Complement(s)}
\end{array}
\]

As represented in the tree structures, complements are sisters of the lexical head X, whereas modifiers are sisters of a phrasal head. This structural difference between complements and modifiers provides a clean explanation for the contrast in do-so test. Given that the verb ate takes only an NP complement whereas put takes an NP and a PP complement, we will have the difference in the two structures shown in (26):

(26) a. \[
\begin{array}{c}
VP \\
\downarrow \\
VP \\
\downarrow \\
V \quad NP \quad PP \\
\downarrow \\
\text{ate} \quad \text{on the table} \\
\downarrow \\
\text{some food}
\end{array}
\]
   b. \[
\begin{array}{c}
VP \\
\downarrow \\
V \quad NP \quad PP \\
\downarrow \\
\text{put} \quad \text{some money} \quad \text{on the table}
\end{array}
\]

In this way, we represent the difference between complements and modifiers.
**Ordering Difference:** Another difference that follows from the structural distinction between complements and modifiers is an ordering difference. As a complement needs to combine with a lexical head first, modifiers follow complements:

(27) a. John met [a student] [in the park].
    b. *John met [in the park] [a student].

A similar contrast can be observed in the following contrast:

(28) a. the student [of linguistics] [with long hair]
    b. *the student [with long hair] [of linguistics]

The PP *with long hair* is a modifier whereas the *of linguistics* is the complement of *student*. This is why *with long hair* cannot occur between the head *student* and its complement *of linguistics.*

As such, observed ordering restrictions can provide more evidence for the distinction between complements and modifiers.

### 4.3 PS Rules, X’-Rules, and Features

We have seen in Chapter 2 that PS rules can describe how English sentences are formed. However, two main issues arise with the content of PS rules. The first is related to the **headedness** of each phrase, often called the ‘endocentricity’ property of each phrase.

Let us consider the PS rules that we saw in the previous chapters. We have seen that PS rules such as those in (29) can characterize well-formed phrases in English, together with an appropriate lexicon:

(29) a. S → NP VP
    b. NP → Det AdjP* N
    c. VP → V (NP) (VP)
    d. VP → V NP AP
    e. VP → V NP NP
    f. VP → V S
    g. AP → A VP
    h. PP → P NP
    i. VP → Adv VP

One common property of all these rules is, as we have discussed, that every phrase has its own head. In this sense, each phrase is the projection of a head, and thereby has the endocentricity. However, we can ask the theoretical question of whether or not we can have rules like the following, in which the phrase has no head at all:

(30) a. VP → P NP

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42 See ?? for the further differences between *with long hair* and *of linguistics.*

43 The discussion of this section is based on Sag et al. (2003).
b. NP → PP S

Nothing in the grammar makes such PS rules unusual, or different in any way from the set in (29). Yet, if we allow such ‘non-endocentric’ PS rules in which a phrase does not have a lexical head, the grammar would then be too powerful to generate only the grammatical sentences of the language.

Another limit that we can find from the simple PS rules concerns an issue of redundancy. Observe the following:

(31) a. *The problem disappeared the accusation.
   b. The problem disappeared.

   b. The defendant denied the accusation.

(33) a. *The boy gave the book.
   b. The boy gave the baby the book.

What these examples show is that each verb has its own requirement for its complement(s). For example, deny requires an NP, whereas disappear does not, and give requires two NPs as its complements. The different patterns of complementation are said to define different subcategories of the type verb. The specific pattern of complements is known as the ‘subcategorization’ requirement of each verb, which can be represented as following (IV: intransitive, TV: transitive, DTV: ditransitive):

(34) a. disappear: IV, _
   b. deny: TV, _ NP
   c. give: DTV, _ NP NP

In addition, in order to license the grammatical sentences in (31)–(33), we need to have the following three VP rules:

(35) a. VP → IV
   b. VP → TV NP
   c. VP → DTV NP NP

We can see here that in each VP rule, only the appropriate verb can occur. That is, a DTV cannot form a VP with the rules in (35a) or (35b): It forms a VP only according to the last PS rule. Each VP rule thus also needs to specify the kind of verb that can serve as its head.

Taking these all together, we see that a grammar of the type just suggested must redundantly encode the subcategorization information both in the lexical type of each verb (e.g., DTV) and in the PS rule for that type of verb.

A similar issue of redundancy arises in accounting for subject-verb agreement:

(36) a. The bird devours the worm.
   b. The birds devour the worm.
To capture the fact that the subject NP agrees with the predicate VP, we need to differentiate the S rule into the following two:

(37)  
(a) \( S \rightarrow NP_{\text{singular}} \ VP_{\text{singular}} \) (for (36)a)  
(b) \( S \rightarrow NP_{\text{plural}} \ VP_{\text{plural}} \) (for (36)b)

Descriptively, there is no problem with a grammar with many specific parts. From a theoretical perspective, though, we have a concern about the the endocentricity and redundancy issues. A more particular related question is that of how many PS rules English has. For example, how many PS rules do we need to characterize English VPs?—Presumably there are as many rules as there are subcategories of verb.

We need to investigate the abstract content of PS rules, in order to develop a theoretical view of them. For example, it seems to be the case that each PS rule must have a ‘head’. This will disallow many possible PS rules which we can write using the rule format, from being actual rules of any language.

In order to understand more about the structures that rules describe, we need two more notions, ‘intermediate category’ and ‘specifier’. We motivate the idea of the intermediate category, and then specifier is a counterpart of it. Consider the examples in (38):

(38)  
(a) Every photo of Max and sketch by his students appeared in the magazine.  
(b) No photo of Max and sketch by his students appeared in the magazine.

What are the structures of these two sentences? Do the phrases *every photo of Max* and *sketch by his students* form NPs? It is not difficult to see *sketch by his students* is not a full NP by itself, for if it was, it should be able to appear as subject by itself:

(39)  
*Sketch by his students appeared in the magazine.

In terms of the semantic units, we can assign the following structures to the above sentences, in which *every* and *no* operate over the meaning of the rest of the phrase:

(40)  
(a) [Every ([photo of Max] and [sketch by his students])] appeared in the magazine.  
(b) [No ([photo of Max] and [sketch by his students])] appeared in the magazine.

The expression *photo of Max* and *sketch by his students* are phrasal elements but not full NPs — so what are they? We call these are ‘intermediate phrases’, notationally represented as N-bar or N’. The phrase N’ is thus intuitively bigger than a noun, but smaller than a full NP, in the sense that it still requires a determiner from the class *the, every, no, some*, and the like.

The complementary notion that we introduce at this point is ‘specifier’ (SPR), which can include the words just mentioned as well as phrases, as we illustrate in (41):

(41)  
(a) [the enemy’s] [N’ destruction of the city]  
(b) [The enemy] [VP destroyed the city].

The phrase *the enemy’s* in (41a) and the subject *the enemy* in (41b) are semantically similar in the sense that they complete the specification of the event denoted by the predicate. These phrases are treated as the specifiers of N’ and of VP, respectively.
As for the possible specifiers of \( N' \), observe the following:

(42) a. a little dog, the little dogs (indefinite or definite article)
    b. this little dog, those little dogs (demonstrative)
    c. my little dogs, their little dog (possessive adjective)
    d. every little dog, each little dog, some little dog, either dog, no dog (quantifying)
    e. my friend’s little dog, the Queen of England’s little dog (possessive phrase)

The italicized expressions here all function as the specifier of \( N' \). However, notice that though most of these specifiers are determiners, some consist of several words as in (42e) (my friend’s, the Queen of England’s). This motivates us to introduce the new phrase type DP (determiner phrase) that includes the possessive phrase (NP + ’s) as well as determiners. This new phrase then will give us the generalization that the specifier of \( N' \) is a DP.\(^{44}\)

Now let us compare the syntactic structures of (41a) and (41b):

(43) \[
\begin{array}{c}
\text{NP} \\
\text{DP} \\
\text{the enemy’s} \\
\text{N} \\
\text{destruction} \\
\text{PP} \\
\text{of the city}
\end{array}
\]

(44) \[
\begin{array}{c}
\text{S} \\
\text{NP} \\
\text{The enemy} \\
\text{V} \\
\text{destroyed} \\
\text{NP} \\
\text{the city}
\end{array}
\]

Even though the NP and S are different phrases, we can notice several similarities. In the NP structure, the head N \textit{destruction} combines with its complement and forms an intermediate phrase \( N' \) which in turn combines with the specifier DP \textit{the enemy’s}. In the S structure, the head V combines with its complement \textit{the city} and forms a VP. This resulting VP then combines with

\(^{44}\)Some analyses take the whole expression in (43) to be a DP (e.g., a little dog, my little dogs) in which expressions like \textit{little dog} is not an \( N' \) but an NP.
the subject *the enemy*, which is also a specifier. In a sense, the VP is an intermediate phrase that requires a subject in order to be a full and complete S.

Given these similarities between NP and S structures, we can generalize over them as in (45), where X is a variable over categories such as N, V, P, and other grammatical categories:

\[
(45) \quad XP \\
\quad \quad \quad \text{Specifier} \quad X' \\
\quad \quad \quad \quad \quad X \quad \text{Complement(s)}
\]

This structure in turn means the grammar now includes the following two rules:

\[
(46) \quad \text{a. } XP \to \text{Specifier, } X' \quad \text{(HeadSpecifier Rule)} \\
\quad \text{b. } XP \to X, YP^* \quad \text{(HeadComplement Rule)}
\]

These HeadSpecifier and HeadComplement Rules, which form the central part of ‘X’-theory’, account for the core structure of NP as well as that of S. In fact, these two general rules can also represent most of the PS rules we have seen so far. In addition to these two, we just need one more rule:

\[
(47) \quad \text{XP} \to \text{Modifier, } X' \quad \text{(HeadModifier Rule)}
\]

This Head-Modifier Rule allows a modifier to combine with its head as in the PS rule VP → VP Adv/PP.

One thing to notice in the Head-Complement Rule is that the head must be a lexical element. This in turn means that we cannot apply the Head-Modifier Rule first and then the Head-Complement Rule. This explains the following contrast:

\[
(48) \quad \text{a. } \text{the king [of Rock and Roll] [with a hat]} \\
\text{b. } *\text{the king [with a hat] [of Rock and Roll]}
\]

The badness of (48b) is due to the fact that the modifier *with a hat* is combined with the head *king* first.

---

45We can assume that the head of S is VP and that VP is an intermediate phrase in the sense that it still requires a subject as its specifier.

46Unlike the PS rules we have seen so far, the rules here are further abstracted, indicated by the comma notation between daughters on the right-hand side. We assume that the relative linear order of a head and complements etc. is determined by a combination of general and language-specific ordering principles, while the hierarchical $X'$-structures themselves are universal.

47The comma indicates that the modifier can appear either before the head or after the head.
We can observe in (49b) that the combination of *king with with a hat* forms an N′, but the combination of the complement *of Rock and Roll* with this N′ will not satisfy the Head-Complement Rule.

The existence and role of the intermediate phrase N′, which is a larger than a lexical category but still not a fully-fledged phrase, can be further supported from the pronoun substitution examples in (50):

(50) a. The present king of country music is more popular than the last one.
   b. *The king of Rock and Roll is more popular than the one of country music.

Why do we have the contrast here? One simple answer is that the pronoun one here replaces an N′ but not an N or an NP. This will also account for the following contrast, too:

(51) A: Which student were you talking about?
    B: The one with long hair.
    B: *The one of linguistics with long hair.

The phrase *of linguistics* is the complement of student. This means the N-bar pronoun one should include this. However, the modifier *with long hair* cannot be within the N′.

There exist several more welcoming consequences that the three X′ rules that bring to us. The grammar rules can account for the same structures as all the PS rules we have seen so far: with those rules we can identify phrases whose daughters are a head and its complement(s), or
a head and its specifier, or a head and its modifier. The three X’ rules thereby greatly minimize the number of PS rules that need to characterize well-formed English sentences.

In addition, these X’ rules directly solve the endocentricity issue, for they refer to ‘Head’. Assume that X is N, then we will have N, N’, and NP structures. We can formalize this more precisely by introducing the feature POS (part of speech), which has values such as noun, verb, adjective. The structure (52) shows how the values of the features in different parts of a structure are related:

\[
(52) \quad \text{XP}[\text{POS }1] \leftarrow \text{Specifier} \quad \text{X’}[\text{POS }1] \\
\quad \text{X}[\text{POS }1] \quad \text{Complement(s)}
\]

The notation 1 shows that whatever value the feature has in one place in the structure, it has the same value somewhere else. This is a representational tag, in which the number 1 has no significance: it could as easily be 2 or 3. We provide more details of the formal feature system in the following section.

So (52) indicates that the phrase’s POS value is identical to its head daughter, capturing the headedness of each phrase: the grammar just does not allow any phrase without a head. The redundancy issue mentioned above for agreement is now a matter of introducing another feature, NUMBER. That is, with the new feature NUMBER, with values singular and plural, we can add a detail to the Head-Specifier Rule as following:

\[
(53) \quad \text{XP} \to \text{Specifier}[\text{NUMBER }1], \text{X’}[\text{NUMBER }1]
\]

The rule states that the subject’s NUMBER value is identical with that of the predicate VP’s NUMBER value. The two rules in (37) are both represented in (53).

### 4.4 Lexicon and Feature Structures

In the previous section, we have seen that the properties of a lexical head determine the components of the minimal phrase, in terms of complements, and that other properties of the head are directly properties of the phrase. This information is encoded in a lexical entry, for each word in the lexicon.

Every lexical entry at least includes phonological (but in practice, orthographic), morphological, syntactic, and semantic information. For example, the word *puts* will have at least the following information:

\[
(54) \quad \text{Minimal Lexical Information for } \text{puts}: \\
\quad a. \text{phonological information: } <\text{puts}> \\
\quad b. \text{syntactic information: } \text{verb, finite, 3rd singular} \\
\quad c. \text{argument information: } <\text{agent}_i, \text{theme}_j, \text{location}_k>
\]
The phonological information is the information about how the word is pronounced; the syntactic information indicates that this particular word is a verb and is in the 3rd singular present (finite) form. The argument structure represents the number of arguments which the verb selects, to indicate the participants that are minimally involved in the event expressed by the verb. This argument information is linked to its more precise meaning as indicated by the indexes \(i\), \(j\) and \(k\). These indexes refer to the participants denoted by the arguments. Finally, the semantic structure represents that the verb’s meaning relates three participants – someone \(i\) who is doing the action of putting, something \(j\) being put in a place, and someplace \(k\) it is put in. These lexical entries can be represented in a more systematic and precise way with the system of feature structures, which we now introduce.

### 4.4.1 Feature Structures and Basic Operations

Most modern grammars rely on a representation of lexical information in terms of features and their values.\(^{48}\) We present here a formal and explicit way of representing it with **feature structures**. Each feature structure is an attribute-value matrix (AVM):

\[
\begin{bmatrix}
\text{Attribute1} & \text{value1} \\
\text{Attribute2} & \text{value2} \\
\text{Attribute3} & \text{value3} \\
\vdots & \vdots \\
\end{bmatrix}
\]

The value of each attribute can be an atomic element, a list, a set, or a feature structure:

\[
\begin{bmatrix}
\text{Attribute1} & \text{atomic} \\
\text{Attribute2} & \langle \rangle \\
\text{Attribute3} & \{ \} \\
\text{Attribute4} & […] \\
\end{bmatrix}
\]

One important property of every feature structure is that it is **typed**.\(^{49}\) That is, each feature structure is relevant only for a given type. A simple illustration can show why feature structure needs to be typed. The upper left declaration in italics is the **type** of the feature structure:

\[
\begin{bmatrix}
\text{university} \\
\text{NAME kyunghee univ.} \\
\text{LOCATION seoul} \\
\end{bmatrix}
\]

---

\(^{48}\) In particular, grammars such as Head-driven Phrase Structure Grammar (HPSG) and Lexical Functional Grammar (LFG) are couched upon mathematically well-defined feature structure systems. The theory developed in this textbook heavily relies upon the feature structure system of HPSG. See Sag et al. (2003).

\(^{49}\) Even though every feature structure is **typed** in the present grammar, we will not specify the type of each feature structure unless it is necessary for the discussion.
The type *university* may have many properties, including its name and location, but having a *major*, as a subject of study, is inappropriate. In the linguistic realm, we might declare that *tense* is appropriate only for *verb*, for example.

Now consider the following example of a typed feature structure, information about one author of this book:

\[
\begin{array}{l}
\text{author} \\
\text{NAME} \quad \text{kim} \\
\text{SONS} \quad \langle \text{Edward, Richard} \rangle \\
\text{HOBBIES} \quad \{\text{swimming, jogging, reading, . . .}\} \\
\text{ADVANCED-DEGREE} \\
\end{array}
\]

This illustrates the different types of values that attributes (feature names) may have. Here, the value of the attribute NAME is atomic, whereas the value of SONS is a list which represents something relative about the two values, in this case that one is older than the other. So, for example ‘youngest son’ would be the right-most element in the list value of SONS. Meanwhile, the value of HOBBIES is a set, showing that there is no significance in the relative ordering. Finally, the value of the feature ADVANCED-DEGREE is a feature structure which in turn has three attributes.

One useful notion in the feature structure is *structure-sharing*, which we have already seen above in terms of the [ ] notation (see (52)). This is to represent cases where two features (or attributes) have an identical value:

\[
\begin{array}{l}
\text{individual} \\
\text{NAME} \quad \text{kim} \\
\text{TEL} \quad [ ] \\
\text{SONS} \quad \langle \left[ \begin{array}{l}
\text{individual} \\
\text{NAME} \quad \text{richard} \\
\text{TEL} \quad [ ] \\
\end{array} \right], \left[ \begin{array}{l}
\text{individual} \\
\text{NAME} \quad \text{edward} \\
\text{TEL} \quad [ ] \\
\end{array} \right] \rangle \\
\end{array}
\]

For the type *individual*, attributes such as NAME and TEL and SONS are appropriate. (59) represents a situation in which the particular individual *kim* has two sons, and their TEL attribute has a value which is the same as the value of his TEL attribute, whatever the value actually is.

In addition to this, the notion of *subsumption* is also important in the theoretical use of feature structures; the symbol $\sqsubset$ represents subsumption. The subsumption relation concerns the relationship between a feature structure with general information and one with more specific information. In such a case, the general one subsumes the specific one. Put differently, a feature
structure A subsumes another feature structure B if A is not more informative than B.

(60)  
A: \[
\begin{bmatrix}
\text{individual} \\
\text{NAME kim}
\end{bmatrix}
\] \supseteq B: \[
\begin{bmatrix}
\text{individual} \\
\text{NAME kim} \\
\text{TEL 961-0892}
\end{bmatrix}
\]

In (61), A represents more general information than B. This kind of subsumption relation is used to represent ‘partial’ information, for in fact we cannot represent the total information describing all possible worlds or states of affairs. In describing a given phenomenon, it will be more than enough just to represent the particular or general aspects of the facts concerned. Each small component of feature structure will provide partial information, and as the structure is built up, the different pieces of information are put together.

The most crucial operation in feature structures is unification, represented by \(\sqcup\). Feature unification means that two compatible feature structures are unified, conveying more coherent and rich information. Consider the feature structures in (61); the first two may unify to give the third:

(61)  
\[
\begin{bmatrix}
\text{individual} \\
\text{NAME kim}
\end{bmatrix}
\sqcup \begin{bmatrix}
\text{individual} \\
\text{TEL 961-0892}
\end{bmatrix}
\rightarrow
\begin{bmatrix}
\text{individual} \\
\text{NAME kim} \\
\text{TEL 961-0892}
\end{bmatrix}
\]

The two feature structures are unified, resulting a feature structure with both NAME and TEL information. However, if two feature structures have incompatible feature values, they cannot be unified:

(62)  
\[
\begin{bmatrix}
\text{individual} \\
\text{NAME edward}
\end{bmatrix}
\sqcup \begin{bmatrix}
\text{individual} \\
\text{NAME richard}
\end{bmatrix}
\neq
\begin{bmatrix}
\text{individual} \\
\text{NAME edward} \\
\text{NAME richard}
\end{bmatrix}
\]

Since the two smaller feature structures have different NAME values, they cannot be unified. Unification will make sure that information is consistent as it is built up in the analysis of a phrase or sentence.

4.4.2 Feature Structures for Linguistic Entities

Any individual or entity including a linguistic expression can be represented by a feature structure. For example, the word *puts*, whose general type is *verb*, can have a feature structure like the following:

\[\text{\textquoteleft\textquoteleft Later on, we will not represent the PHON and SEM values unless relevant to the discussion at hand.}\]
This feature structure has roughly the same information as the informal representation in (54). The verb *puts*, like any verb, has its own phonological value (PHON), syntactic (SYN), argument structure (ARG-ST), and semantic (SEM) information. The SYN attribute indicates that the POS (part of speech) value is *verb*, that it has a finite verbal inflectional form value (VFORM), and that it is 3rd-singular in terms of the agreement (AGR) value. The ARG-ST attribute indicates that the verb selects for three arguments (with thematic roles agent, theme, location), which will be realized as the subject and two complements in the full analysis. The SEM feature represents the information this verb denotes the predicate relation *put-relation*, whose three participants are linked to the elements in the ARG-ST via the indexing values $i$, $j$, and $k$.

One thing to note here is that since there are some cases where we have difficulties in assigning a specific named semantic role to a selected argument discussed in Chapter 3, we typically just indicate the number of arguments each predicate is selecting in ARG-ST: we underspecify the information unless it is necessary to show more details. So, for example, verbs like *smile*, *devour* and *give* will have the following ARG-ST representations, respectively:

\[(64)\]

a. \[
\begin{array}{c}
\text{ARG-ST} \langle [i \ ] \rangle
\end{array}
\]

b. \[
\begin{array}{c}
\text{ARG-ST} \langle [i \ ], [j \ ] \rangle
\end{array}
\]

c. \[
\begin{array}{c}
\text{ARG-ST} \langle [i \ ], [j \ ], [k \ ] \rangle
\end{array}
\]

One-place predicates like *smile* select for just one argument, two-place predicates like *devour* take two arguments, and three-place predicates take three arguments. Eventually, the arguments selected by each predicate are linked to grammatical functions, to the core semantic properties, and to other parts of the representation of the grammatical properties.
4.4.3 Argument Realization

Each element on the ARG-ST list is realized as SPR (specifier) or COMPS (complements), through one of the rules in (46). In general, the basic pattern is that the first element on the list is realized as subject and the rest as complements:

(65) Argument Realization Constraint (ARC):
The first element on the ARG-ST list is realized as SPR, the rest as COMPS in syntax.

This realization is obligatory in English; for example, the three arguments of *put are realized as subject and complements, with the putter (agent) as subject:

(66) a. John put the book in the box.
    b. *John put in the box.
    c. *In the box put John the book.
    d. #The book put John in the box.

We see that the arguments selected by a lexical head should be all realized as SPR and COMPS, which are combined in the notion of valence (VAL) features. More formally, we can represent this constraint as applied to *put as the following feature structure:

(67) \[
\begin{array}{c}
\text{VAL} \\
\text{COMPS} \\
\text{ARG-ST}
\end{array}
\begin{array}{c}
\text{SPR}\langle \text{NP}\rangle \\
\text{COMPS}\langle \text{NP}, \text{PP}\rangle \\
\text{ARG-ST}\langle 1, 2, 3 \rangle
\end{array}
\]

The boxed tags show the different identities in the overall structure. For example, the first element of ARG-ST and of SPR have the boxed tag 1 ensuring that the two are identical. The general ARC constraint blocks examples like (1c) in which the location argument is realized as the subject, as shown in (68):

(68) *\[
\begin{array}{c}
\text{VAL} \\
\text{COMPS} \\
\text{ARG-ST}
\end{array}
\begin{array}{c}
\text{SPR}\langle \text{PP}\rangle \\
\text{COMPS}\langle \text{NP}, \text{NP}\rangle \\
\text{ARG-ST}\langle 1, 2, 3 \rangle
\end{array}
\]

This violates the ARC, which requires the first element of ARG-ST be realized as the SPR (the subject of a verb or the specifier of a noun).

Notice that the arguments can be realized into different categories, depending on the properties of the given verb:

---

51 Once again, remember that the term SPR includes subject as well as the noun’s specifier.
52 The notation # indicates that the structure is technically well-formed from a syntactic perspective, but semantically anomalous.
53 The term ‘valence’ refers to the number of arguments that a lexical item can combine with, to make a syntactically well-formed sentence, often along with a description of the categories of those constituents. It is inspired by the notion of valence as used in atomic theory in chemistry.
(69)  a. The election results surprised everybody.
       b. That he won the election surprised everybody.

The data indicate that verbs like surprise will take two arguments, but the first argument can be realized either as an NP subject as in (69a) or a CP subject as in (69b). This difference in the argument realization can be represented as the following, respectively:

\[
\begin{align*}
\text{a.} & \quad \begin{bmatrix} 
\text{VAL} & \begin{bmatrix} \text{SPR} & \langle \text{NP} \rangle \\
\text{COMPS} & \langle \text{NP} \rangle \\
\text{ARG-ST} & \langle 1, 2 \rangle \end{bmatrix} \\
\text{b.} & \quad \begin{bmatrix} 
\text{VAL} & \begin{bmatrix} \text{SPR} & \langle \text{CP} \rangle \\
\text{COMPS} & \langle \text{NP} \rangle \\
\text{ARG-ST} & \langle 1, 2 \rangle \end{bmatrix} 
\end{align*}
\]

Though there is no difference in terms of the number of arguments that surprise select, the arguments can be realized in a different phrase. As the book goes on, we will see how the argument realization is further constrained by the lexical properties of the verb in question or by other grammatical components.

4.4.4 Verb Types and Argument Structure

As mentioned earlier, lexical elements in the classes V, A, N, and P, select one or more complement(s) to form a minimal phrase. With the construct of ARG-ST, we know that every lexical element has ARG-ST information which will be realized in surface form through the SPR and COMPS values. Verb types can be differentiated by looking only at the COMPS value since every verb will have one SPR (subject) element. This is exactly the way that verbs are differentiated using the traditional notion of subcategorization.

**Intransitive:** This is a type of verb that does not have any COMPS:

(71)  a. John disappeared.
       b. *John disappeared Bill.

(72)  a. John sneezed.
       b. *John sneezed the money.

These verbs have no COMPS element—the list is necessarily empty. Such a verb will have just one argument that is realized as subject:

\[
\begin{bmatrix} 
\langle \text{disappear} \rangle \\
\text{SPR} & \langle \text{NP} \rangle \\
\text{COMPS} & \langle \rangle \\
\text{ARG-ST} & \langle 1 \rangle \end{bmatrix}
\]

54 For convenience reason, we adopt a shorthand system in representing feature structures, suppressing unrelated features. For example, the fully specified feature structure in (73) will include VAL as well as PHON, SYN, SEM, etc.
**Linking verbs:** Verbs such as *look, seem, remain,* and *feel* require different complements that are typically of category AP:

(74) a. The president looked [weary].
    b. The teacher became [tired of the students].
    c. The lasagna tasted [scrumptious].
    d. John remained [somewhat calm].
    e. The jury seemed [ready to leave].

These verbs also can select other phrases (here, NP):

(75) a. John became a success.
    b. John seemed a fool.
    c. John remained a student.

Though each verb may select different types of phrases, they all at least select a predicative complement, where a property is ascribed to the subject. (Compare *John remained a student* and *John revived a student.*) This subcategorization requirement can be represented as follows:

(76) \[
\begin{array}{c}
\langle \text{become} \rangle \\
\text{SPR} \quad \langle \text{NP} \rangle \\
\text{COMPS} \quad \langle \text{XP[PRD +]} \rangle \\
\text{ARG-ST} \quad \langle 1, 2 \rangle \\
\end{array}
\]

This kind of verb selects two arguments: one is canonically an NP to be realized as the subject and the other is any phrase (XP) that can function as a predicate (PRD +) (see also the examples in (83)). Of course, this presupposes an accurate characterization of which phrases can be [PRD +], which we simply assume here.

**Transitive verbs:** Unlike linking verbs, pure transitive verbs select a referential, non-predicative NP as their complement, functioning as direct object:

(77) a. John saw Fred.
    b. Alice typed the letter.
    c. Clinton supported the health care bill.
    d. Raccoons destroyed the garden.

Such verbs will have the following lexical information:

(78) \[
\begin{array}{c}
\langle \text{destroy} \rangle \\
\text{SPR} \quad \langle \text{NP} \rangle \\
\text{COMPS} \quad \langle \text{NP} \rangle \\
\text{ARG-ST} \quad \langle 1, 2 \rangle \\
\end{array}
\]

**Ditransitive:** There are also ‘ditransitive’ verbs that require more than one complement:

(79) a. The school board leader asked a question of the students.
b. The parents bought non-fiction novels for the children.
c. John taught English Syntax to new students.

Such verbs have three arguments: one subject and two complement NPs functioning as a direct and an indirect object:

\[
\begin{align*}
\text{(teach)} & \\
\text{SPR} & (\text{NP}) \\
\text{COMPS} & (\text{NP}, \text{PP}) \\
\text{ARG-ST} & (\text{theme}, \text{goal})
\end{align*}
\]

In this realization, the second argument has the theme role while the third one has the goal role. These verbs typically have a related realization with two NP complements in order:

\[
\begin{align*}
\text{(teach)} & \\
\text{SPR} & (\text{NP}) \\
\text{COMPS} & (\text{NP}, \text{NP}) \\
\text{ARG-ST} & (\text{theme}, \text{goal})
\end{align*}
\]

The second argument, the theme, is realized as the final complement whereas the goal argument becomes the direct object that can be promoted to the subject of a passive verb. This argument realization will project sentences like the following in which the goal is realized as the direct object:

\[
\begin{align*}
\text{(82) a. The school board leader asked the students a question.} \\
b. The parents bought the children non-fiction novels. \\
c. John taught new students English Syntax.
\end{align*}
\]

**Complex Transitive:** There is another type of transitive verb which selects two complements, one functioning as a direct object and the other as a predicative phrase (NP, AP, or VP), describing the object:

\[
\begin{align*}
\text{(83) a. John regards Bill as a good friend.} \\
b. The sexual revolution makes some people uncomfortable. \\
c. Ad agencies call young people Generation X-ers. \\
d. Historians believe FDR to be our most effective president.
\end{align*}
\]

In (83a), the predicative PP *as a good friend* follows the object *Bill*; in (83b), the AP *uncomfortable* serves as a predicate phrase of the preceding object *some people*. In (83c), the NP *Generation X-ers* is the predicative phrase. In (83d), the predicative phrase is an infinitive VP. Just like linking verbs, these verbs require a predicative ([PRD +]) XP as complement:

\[
\begin{align*}
\text{(call)} & \\
\text{SPR} & (\text{NP}) \\
\text{COMPS} & (\text{NP}, \text{XP}) \\
\text{ARG-ST} & (\text{theme}, \text{[PRD +]})
\end{align*}
\]
This means that the verbs in (83) all select an object NP and an XP phrase that function as a predicate.

Even though these five types of verb that we have seen so far represent many English verb types, there are other verbs that do not fit into these classes; for instance, the use of the verb *carry* in (85).

(85)  a. *John carried to the door.
   b. *John carried her.
   c. John carried her on his back.

The examples in (85) illustrate that *carried* requires an NP and a PP, as represented in the feature structure:

(86) \[
\begin{array}{c}
\langle carry \rangle \\
\text{SPR} \quad \langle 1 \text{NP} \rangle \\
\text{COMPS} \quad \langle 2 \text{NP}, 3 \text{PP} \rangle \\
\text{ARG-ST} \quad \langle [\text{agt}], [\text{th}], [\text{loc}] \rangle
\end{array}
\]

The PP here cannot be said to be predicate of the object *her*; it denotes the location to which John carries her.

Of course, there exist various other verb types that we have not described here, in terms of complementation patterns. As the book goes on, we will see yet more different types of verbs.
4.5 Exercises

1. Provide tree structures for the following two sentences while checking the grammatical function of each phrase with valid distributional tests. What differences do we need to represent?
   (i) a. Tom locked Fido in the garage.
       b. Tom bathed Fido in the garage.

2. For each example below, give the lexical entry of the main verb and discuss the reasoning that led you to your answer.
   (i) a. Tom hid the manuscript in the cupboard.
       b. Fred hired Sharon to change the oil.
       c. They pushed the prisoners into the truck.
       d. Frank hopes to persuade Harry to make the cook wash the dishes.
       e. George mailed the attorney his photograph of the accident.
       f. Gordon tried to open the jar.
       g. Tom keeps asking Karen’s sister to buy the car.
       h. Jane left the book on the table.

3. The verbs in the following sentences are used incorrectly. Correct the errors or replace the verb with another one. In addition, provide the COMPS value for each verb.
   (i) a. *Oliver became and met an expert.
       b. *Oliver ascribed his longevity there.
       c. *Oliver mentioned Charles the problem.
       d. *Oliver fined ten pounds to the prisoner.
       e. *Oliver fell the pencil down the lift shaft.
       f. *Oliver drove me a lunatic.
       g. *Oliver addressed the king the letter.
       h. *Oliver absented his brother from the meeting.

4. Decide which of the post-verbal constituents in the following examples are complements of the verb and which are modifiers. Also provide appropriate valence (SPR and COMPS) information for the italicized verbs.
   (i) a. He keeps a picture of his wife on his desk.
       b. He met the man from the Embassy in the park.
       c. We moved the stereo from the lounge to the bedroom before the party.
       d. They seemed intelligent to me when I interviewed them.
       e. We appealed to him to work harder last week.

5. Draw tree structures for the following two sentences. In particular, provide detailed NP structures using the intermediate phrase N′:
   (i) a. The love of my life and father of my children would never do such a thing.
       b. The museum displayed no painting by Miro or drawing by Klee.
6. Consider the following English sentences and provide the lexical entries for *wrote* and *worded*:

   (i) a. Kim wrote the beginning paragraph carelessly.
       b. Kim worded the beginning paragraph carelessly.

   (ii) a. Kim wrote that letter.
       b. *Kim worded that letter.

As we have seen in this chapter, *do so* can replace a minimal or maximal VP phrase. Based on the difference between *wrote* and *worded* and the property of *do so* test, can you see that in (iiiia) *so did* can have two readings whereas in (iiib) it can have only one reading? If you can, explain why?

   (iii) a. Kim wrote the preface carelessly, and so did Lee.
       b. Kim worded the preface carelessly, and so did Lee.

7. Read the following texts and provide the ARG-ST of the italicized words and their SPR and COMPS values:

   (i) Learning to *use* a language freely and fully is a lengthy and effortful process. Teachers cannot *learn* the language for their students. They can *set* their students on the road, *helping* them to develop confidence in their own learning powers. Then they must *wait* on the sidelines, *ready* to encourage and assist.

   (ii) Deep ecologists *put* a reign on human exploitation of natural “resources” except to *satisfy* vital needs. Thus, the use of a field by an African tribe to *grow* grain for survival is an example of a vital need whereas the *conversion* of a swamp to an exclusive golf course would not. Rest *assured* that much of the mining, harvesting, and development of our technological age would not *meet* the requirement of this principle. Rather than being *concerned* about how to *raise* automobile production, this ethic would be *interested* in solving the problem of human mobility in a way that would not *require* the disruption of highways, roads, and parking lots. It *rebels* against an industrialist world view: “Before it is possessed and used, every plant is a weed and every mineral is just another rock.”\(^{55}\)

---

More on Subjects and Complements

5.1 Grammar Rules and Principles

As we have seen in the previous chapter, the arguments in ARG-ST are realized as the syntactic elements SPR (subject of a verb and determiner of a noun) and COMPS. The X’ rules control their combination with a relevant head:

(1) a. XP →Specifier, Head
    b. XP →Head, Complement(s)
    c. XP →Head, Modifier

The rule (1a) represents the case where a head combines with its specifier (e.g., a VP with its subject and an N’ with its determiner), whereas (1b) says that a head combines with its complement(s) and forms a phrase. (1c) allows a combination of a head with its modifier. As noted earlier, in order to guarantee that the head’s POS (part of speech) value is identical with its mother phrase, we need to introduce the category variable X and the feature POS:

(2) a. Head-Specifer Rule:
    XP[POS 1] →Specifier, X’[POS 1]

    b. Head-Complement Rule:
    XP[POS 1] →X[POS 1], Complement(s)

    c. Head-Modifier Rule:
    XP[POS 1] →Modifier, XP[POS 1]

The POS feature is thus a head feature which passes up to a ‘mother’ phrase from its head ‘daughter’, as shown in (3):

(3) VP[POS verb]  
     V[POS verb]  
     PP

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This percolation from a head to its mother is ensured by the following Head Feature Principle:

(4) The Head Feature Principle (HFP):
A phrase’s head feature (e.g., POS, VFORM, etc.) is identical with that of its head.

The HFP thus ensures that every phrase has its own lexical head with the identical POS value. The HFP will apply to any features that we declare to be ‘head features’, VFORM being another.

The grammar does not allow hypothetical phrases like the following:

(5) *VP[POS verb]  
A[POS adj] PP

We have not yet spelled out clearly what ensures a lexical head to combine not just with one of its complements but with all of its COMPS elements. Consider the following examples:

(6) a. Kim put the book in the box.  
c. *Kim put in the box.

As seen from the contrast here and as noted in the lexical entry in (7), the verb put selects two complements and must combine with all of its complements.

(7) [HEAD | POS verb]  
SPR ⟨NP⟩  
COMPS ⟨NP, PP⟩

We can also see that a finite verb must combine with its subject:

(8) a. *Is putting the book in the box.  
b. *Talked with Bill about the exam.

Such combinatorial requirements can be formally stated in the revised grammar rules as given in (9):

(9) a. Head-Specifier Rule:  
XP[SPR ⟨⟩] → H[SPR ⟨⟩]

b. Head-Complement Rule:  
XP[COMPS ⟨⟩] → H[COMPS ⟨⟩], ⟨⟩, … , ⟨⟩

c. Head-Modifier Rule:  
XP → [MOD ⟨⟩], ⟨⟩

The grammar rules here are well-formedness conditions on possible phrases in English, indicating what each head combines with and then what happens as the result of the combination.
For example, in (9a) when a head, requiring a SPR, combines with it, we have a well-formed head-specifier phrase with the SPR value discharged; in (9b), a head combines with all of its COMPS value, it forms a Head-Complement phrase with no further COMPS value; in (9c), when a modifier combines with the head it modifies, the resulting phrase forms a well-formed head-modifier phrase.\(^{56}\)

These three grammar rules, interacting with the general principles such as the HFP, license grammatical sentences in English. Let us consider one example in a little more detail:

\[(10)\]

\[
\begin{array}{c}
\text{S} \\
\text{HEAD} \square | \text{POS verb} \\
\text{SPR} \langle \rangle \\
\text{COMPS} \langle \rangle \\
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\text{Subj} \\
\text{NP} \\
\text{Kim} \\
\end{array}
\]

\[
\begin{array}{c}
\text{VP} \\
\text{HEAD} \square | \text{POS verb} \\
\text{SPR} \langle 1 \rangle \\
\text{COMPS} \langle 2, 3 \rangle \\
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\text{V} \\
\text{C} \\
\text{C} \\
\text{NP} \\
\text{PP} \\
\end{array}
\]

\[
\begin{array}{c}
\text{deposits} \\
\text{some money} \\
\text{in the bank} \\
\end{array}
\]

The finite verb *deposits* selects a subject (a specifier) and two complements. The HFP ensures that the head feature POS values of the verb, its mother VP and S are all identical. When the lexical head combines with its two complements, the COMPS value becomes empty, forming a VP in accordance with the Head-Complement Rule. This VP will still need to combine with its SPR in order to form a complete sentence. This kind of ‘discharging’ mechanism is further ensured by the following general principle:

\(^{56}\text{In addition to these three grammar rules, English employs the Head-Filler Rule that licenses the combination of a head missing one phrasal element with a filler that matches this missing element, as in What did John eat _?}. \text{ See Chapter 10 for discussion of this rule.}\)
(11) The Valence Principle (VALP):
The mother’s SPR and COMPS value is identical with its head daughters minus the
discharged value(s).

This principle thus ensures that when the VP in (10) combines with the subject SPR, it forms a
complete S in accordance with the Head-Specifier Rule. More generally, the VALP ensures that
each verb combines in the syntactic structure with exactly all and only the syntactic dependents
that its SPR and COMPS values indicate.

5.2 Feature Specifications on the Complement Values

5.2.1 Complements of Verbs

Intuitively, English verbs have 6 grammatical forms. For example, the verb drive can take these
forms: drives, drove, driving, driven, to drive, in addition to the citation form. The present and
past tense forms are usually classified together as fin(ite), with all the rest being nonfin(ite) in
some way. Using this division, we might lay out the forms as in (12):

(12) Types of English Verb Forms:

<table>
<thead>
<tr>
<th>Finiteness</th>
<th>Verb forms</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>fin</td>
<td>pres</td>
<td>He drives a car.</td>
</tr>
<tr>
<td></td>
<td>past</td>
<td>He drove a car.</td>
</tr>
<tr>
<td></td>
<td>bse</td>
<td>He wants to drive a car.</td>
</tr>
<tr>
<td></td>
<td>prp</td>
<td>Driving a car, he sang a song. He was driving. He is proud of driving a car.</td>
</tr>
<tr>
<td></td>
<td>psp</td>
<td>Driven by the mentor, he worked. The car was driven by him. He has driven the car.</td>
</tr>
<tr>
<td></td>
<td>inf</td>
<td>He has to drive.</td>
</tr>
</tbody>
</table>

We will refer to the citation form of a verb as its ‘base’ form (bse). The fin forms have two
subtypes pres(ent) and past which are typically realized as -s and -ed form, respectively. The
nonfin forms have the basic forms of bse, prp (present participle), and psp (past participle),
and infinitive. In fact, the bse form can be used to express a certain kind of finite clause
(a subjunctive clause, for example with be as in I demand that they [be] released). We also
follow the fairly standard generative grammatical analysis of English ‘infinitives’ in which the
infinitive part is a head (to) which takes as its complement a verb in the bse form. This has the
consequence that there is only one verb in English with an infinitive form: to itself.

With these classifications, we propose the following hierarchy for the values of the attribute
VFORM:
The classification of VFORM values here means that the values of VFORM can be typed, and those types have different subtypes. Sometimes we want to be able to refer to the type of a value, as in (14a), and sometimes to a particular form, as in (14b).

(14) a. [VFORM fin]
    b. [VFORM prp]

The need to distinguish between fin and nonfin is easily determined. Every declarative sentence in English needs to have a finite verb with tense information:

(15) a. The student [knows the answers].
    b. The student [knew the answers].
    c. The students know the answers.

(16) a. *The student [knowing the answers].
    b. *The student [known the answers].

The unacceptability of the examples in (16) is due to the fact knowing and known have no expression of tense – they are not finite. This in turn shows us that only finite verb forms can be used as the head of the highest VP in a declarative sentence, satisfying a basic requirement placed on English declarative sentences:

(17) English Declarative Sentence Rule:
    For an English declarative sentence to be well-formed, its verb form value (VFORM) must be finite.

The finiteness of a sentence or a VP comes from the head verb, showing that the finiteness of the VFORM value is a head feature:

(18) S[ VFORM [pres ] ]
      VP[ VFORM [pres ] ]
      NP

There are additional points that we wish to note. First, when the subject is a not 3rd singular, the present tense verb form in English is identical with the base form:

(19) a. I/You/They/We sing a song.
b. They drive a fancy car.

Even though the present form of the verb whose subject is non-3rd singular thus has no inflectional ending, as such, we take it to bear the VFORM value *pres*.

We also need to remember that the two participle forms (present and past) have many different uses, in different constructions, as partially exemplified in (20) and (21).

(20) Usages of the Present Participle:
   a. He is writing another long book about beavers.  
      (part of the the progressive aspect construction) 
   b. Let sleeping dogs lie.  
      (used as a noun modifier) 
   c. Broadly speaking, the project was successful.  
      (used as a sentence modifier) 
   d. He is proud of his son’s passing the bar exam.  
      (used in a gerundive construction)

(21) Usages of the Past Participle:
   a. The chicken has eaten.  
      (part of the perfect aspect construction) 
   b. The chicken was eaten.  
      (part of the passive voice construction) 
   c. He forgot to check the attached files  
      (used as a noun modifier) 
   d. Seen from this perspective, there is no easy solution.  
      (used as a sentence modifier)

Some of these usages have been introduced as VFORM values for the ease of exposition, though strictly speaking, there are only two participle *forms* in English, which each have several functions or constructional usages.

Every verb will be specified for a value of the head feature VFORM. For example, let us consider a simple example like *The student knows the answer*. Here the verb *knows* will have the following lexical information:

\[
\begin{align*}
\text{HEAD} & \left[ \begin{array}{c}
\text{POS} \quad \text{verb} \\
\text{VFORM} \quad \text{pres}
\end{array} \right] \\
\text{VAL} & \left[ \begin{array}{c}
\text{SPR} \quad \langle \text{NP} \rangle \\
\text{COMPS} \quad \langle \text{NP} \rangle
\end{array} \right]
\end{align*}
\]

\[\text{ARG-ST} \langle \text{[ ]} \rangle\]

\[\text{(22)}\]

---

\[57\text{See, for example, Gazdar et al. (1985) or Ginzburg and Sag (2000).}\]
This [VFORM pres] value will be projected to the S in accordance with the HFP, as represented in the following:

\[
S \rightarrow \text{NP} \leftarrow \text{VP}
\]

\[
\begin{array}{c}
\text{NP} \\
\text{VP} \\
\text{S}
\end{array}
\]

\[
\begin{array}{c}
\text{The student} \\
\text{knows} \\
\text{the answer}
\end{array}
\]

\[
\begin{array}{c}
\text{NP} \\
\text{VP} \\
\text{S}
\end{array}
\]

It is easy to verify that if we have *knowing* instead of *knows* here, the S would have the [VFORM prp] and the result could not be a well-formed declarative sentence. This is simply because the value *prp* is a subtype of *nonfin*.

There are various constructions in English where we need to refer to VFORM values, such as:

\[
(24) \quad a. \quad \text{The monkeys kept [forgetting/*forgot/*forgotten their lines]. (prp)} \\
    b. \quad \text{We caught them [eating/*ate/*eat/*eaten the bananas]. (prp)} \\
    c. \quad \text{John made Mary [cook/*to cook/*cooking Korean food]. (bse)}
\]

Even though each main verb here requires a VP as its complement (the part in brackets), the required VFORM value could be different, as illustrated by the following lexical entries:

\[
(25) \quad a. \quad \text{[keep]}
    \begin{array}{c}
    \text{HEAD} \\
    \text{POS} \quad \text{verb} \\
    \text{COMPS} \quad \langle \text{VP[prp]} \rangle
    \end{array}
\]

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

\[
\begin{array}{c}
\text{HEAD} \\
\text{POS} \quad \text{verb} \\
\text{COMPS} \quad \langle \text{NP, VP[bse]} \rangle
\end{array}
\]

Such lexical specifications on the VP’s VFORM value will make sure that these verbs only combine with a VP complement with the appropriate VFORM value. The following structure represents one example:
The finite verb *kept* selects as its complement a VP whose VFORM value is *prp*. The verb *forgetting* has this VFORM value which is passed up to its mother VP in accordance with the HFP. The Head-Complement Rule allows the combination of the head verb *kept* with this VP. In the upper part of the structure, the VFORM value of the verb *kept* is also passed up to its mother node VP, ensuring that the VFORM value of the S is a subtype of *fin*, satisfying the basic English rule for declarative sentences.

### 5.2.2 Complements of Adjectives

There are at least two types of adjectives in English in terms of complement selection: those selecting no complements at all, and those taking complements. As shown in the following examples, an adjective like *despondent* optionally takes a complement, while *intelligent* does not take any complements:

(27) a. The monkey seems despondent (that it is in a cage).
    b. He seems intelligent (*to study medicine).
Adjectives such as *eager*, *fond* and *compatible* each select a complement, possibly of different categories (for example, VP or PP).

(28) a. Monkeys are eager [to leave/*leaving the compound].
    b. The chickens seem fond [of/*with the farmer].
    c. The foxes seem compatible [with/*for the chickens].
    d. These are similar [to/*with the bottles].
    e. The teacher is proud [of/*with his students].
    f. The contract is subject [to/*for approval by my committee].

One thing we can note again is that the complements also need to be in a specific VFORM and PFORM value, where PFORM indicates the form of a specific preposition, as illustrated in examples (28b–f). Just like verbs, adjectives also place restrictions on the VFORM or PFORM value of their complement. Such restrictions are also specified in the lexical information, for example:

(29) a. $\langle\text{eager}\rangle$
    $\text{HEAD} | \text{POS adj}$
    $\text{SPR} \langle\text{NP}\rangle$
    $\text{COMPS} \langle\text{VP[VFORM inf]}\rangle$

b. $\langle\text{fond}\rangle$
    $\text{HEAD} | \text{POS adj}$
    $\text{SPR} \langle\text{NP}\rangle$
    $\text{COMPS} \langle\text{PP[PFORM of]}\rangle$

Such lexical entries will project sentences like the following:
As represented in this simplified tree structure, the adjective *eager* combines with its VP[inf] complement in accordance with the Head-Complement Rule. In addition, this rule also licenses the combination of the infinitival marker *to* with its VP[bse] complement and the combination of the copula *are* with its AP complement. The HFP ensures the HEAD features, POS and VFORM, are passed up to the final S. Each structure will satisfy all the relevant constraints and principles.

5.2.3 Complements of Common Nouns

Nouns do not usually select complements, though they often may have specifiers. For example, common nouns like *idea, book, beer* etc. require only a specifier, but no complement. Yet there also are nouns which do require a specific type of complement, such as *proximity, faith, king, desire, and bottom*:

(31) a. their proximity to their neighbors/*for their neighbors
   b. Bill’s faith in/*for Fred’s sister
   c. the king of/*in English
   d. the desire to become famous/*for success
   e. the bottom of/*in the barrel

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Although these complements can be optional in the right context, they are grammatically classified as complements of the nouns, and should be represented in the following simplified lexical entries:

(32) a. 
\[
\begin{array}{c|c}
\text{HEAD} & \text{POS} \\
\hline
\text{proximity} & \text{noun} \\
\end{array}
\]

\[
\begin{array}{c|c}
\text{SPR} & \text{DP} \\
\hline
\text{COMPS} & \text{PP[PF} \text{orm to]} \\
\end{array}
\]

b. 
\[
\begin{array}{c|c}
\text{faith} & \text{noun} \\
\hline
\text{SPR} & \text{DP} \\
\hline
\text{COMPS} & \text{PP[PF} \text{orm in]} \\
\end{array}
\]

Though many more details remain to be covered for the various complement types of lexical categories, the discussion so far has given an idea of what kinds of complement lexical categories select for.

5.3 Feature Specifications for the Subject

In general, most verbs select a regular NP as subject:

(33) a. John/Some books/The spy disappeared.
   b. The teacher/The monkey/He fooled the students.

However, as noted in the previous chapter, certain English verbs select only it or there as subject:

(34) a. It/*John/*There rains.
   b. There/*The spy lies a man in the park.

The pronouns it and there are often called ‘expletives’, indicating that they do not have or contribute any meaning. The use of these expletives is restricted to particular contexts or verbs, though both forms have regular pronoun uses as well. One way to specify such lexical specifications for subjects is to make use of a form value specification for nouns; all regular nouns [NFORM norm(al)] as default specification; overall we classify nouns as having three different NFORM values: normal, it, and there. Given the NFORM feature, we can have the following lexical entries for the verbs above:

(35) a. 
\[
\begin{array}{c|c}
\langle \text{rained} \rangle & \text{SPR} \\
\hline
\text{COMPS} & \langle \text{NP[NFORM it]} \rangle \\
\end{array}
\]

58DP covers not only simple determiners like a, the, and that, but also includes a possessive phrase like John’s. In Chapter 6 we cover NP structures in detail.
b. \[
\begin{bmatrix}
\langle \text{fooled} \rangle \\
\text{SPR} & \langle \text{NP}[\text{NFORM norm}] \rangle \\
\text{COMPS} & \langle \text{NP} \rangle
\end{bmatrix}
\]

One thing to note here is that ‘weather verbs’ like rain and existential verbs like be do not assign any semantic role to their subject. This in turn means that in terms of the ARG-ST, weather verbs at least do not have any semantic arguments at all. However, English syntax has a rule that every clause must have a subject.\(^{59}\) We need to ensure that the Argument Realization Constraint forces all verbs to have a SPR value even if there is no corresponding value in ARG-ST:\(^{60}\)

\[
(36) \begin{bmatrix}
\langle \text{rain} \rangle \\
\text{SPR} & \langle \text{NP}[\text{NFORM it}] \rangle \\
\text{COMPS} & \langle \rangle \\
\text{ARG-ST} & \langle \rangle
\end{bmatrix}
\]

We can also observe that only a limited set of verbs require their subject to be \([\text{NFORM there}]\):\(^{61}\)

\[
(37) \begin{align*}
\text{a.} & \quad \text{There exists only one truly amphibian mammal.} \\
\text{b.} & \quad \text{There arose a great storm.}
\end{align*}
\]

\[
(38) \begin{align*}
\text{a.} & \quad \text{There exist few solutions which are cost-effective.} \\
\text{b.} & \quad \text{There is a riot in the park.} \\
\text{c.} & \quad \text{There remained just a few problems to be solved.}
\end{align*}
\]

The majority of verbs do not allow there as subject:

\[
(39) \begin{align*}
\text{a.} & \quad \ast \text{There runs a man in the park.} \\
\text{b.} & \quad \ast \text{There sings a man loudly.}
\end{align*}
\]

For the sentences with there subjects, we first consider the verb forms which have regular subjects. A verb like exist in (37a) takes one argument when used in an example like Only one truly amphibian mammal exists, and the argument will be realized as the SPR, as dictated by the entry in (40a). In addition, such verbs can introduce there as the subject, through the Argument Realization option given in (40b), which is the form that occurs in the structure of (37a).

\[
(40) \begin{bmatrix}
\langle \text{exists} \rangle \\
\text{SPR} & \langle \square \text{NP} \rangle \\
\text{COMPS} & \langle \rangle \\
\text{ARG-ST} & \langle \square \rangle
\end{bmatrix}
\]

\(^{59}\)This constraint can be found instantiated as the Final 1 Law of Relational Grammar (Perlmutter (1983), Perlmutter and Rosen (1984)), or the Extended Projection Principle in Government-Binding Theory (Chomsky (1981)), or the subject condition in Lexical-Functional Grammar (Bresnan (1982)).

\(^{60}\)This in turn means that we need to have a finer-grained approach to the Argument Realization Constraints.

\(^{61}\)Some verbs such as arise or remain sound a little archaic in these constructions.
5.4 Clausal Complement or Subject

5.4.1 Verbs Selecting a Clausal Complement

We have seen that the COMPS list includes predominantly phrasal elements. However, there are verbs selecting not just a phrase but a whole clause as a complement, either finite or nonfinite. For example, consider the complements of *think* or *believe*:

(41) a. I think (that) the press has a check-and-balance function.
    b. They believe (that) Charles Darwin’s theory of evolution is just a scientific theory.

The C (complementizer) *that* here is optional, implying that this kind of verb selects for a finite complement clause of some type, which we will notate as a \([VFORM \text{fin}]\) clause. That is, these verbs will have one of the following two COMPS values:

(42) a. \[
\begin{array}{l}
\text{COMPS} \langle S[VFORM \text{fin}] \rangle \\
\end{array}
\]

b. \[
\begin{array}{l}
\text{COMPS} \langle CP[VFORM \text{fin}] \rangle \\
\end{array}
\]

If the COMPS value only specifies a VFORM value, the complement can be either S or CP. This means that we can subsume these two uses into the following single lexical entry, suppressing the category information of the sentential complement:

(43) \[
\begin{array}{l}
\langle \text{believe} \rangle \\
\text{HEAD | POS verb} \\
\text{COMPS \langle [VFORM \text{fin}] \rangle} \\
\end{array}
\]

We can also find somewhat similar verbs like *demand* and *require*:

(44) a. John demanded [that she stop phoning him].
    b. The rules require [that the executives be polite].

Unlike *think* or *believe*, these verbs which introduce a subjunctive clause typically only take a CP\([VFORM \text{bse}]\) as their complement: the finite verb itself is actually in the \textit{bse} form. Observe the structure of (44b):

\[62\text{Although the categories V or VP are also potentially specified as [VFORM fin], such words or phrases cannot be complements of verbs like *think* or *believe*. This is because complements are typically saturated phrases, with no unsatisfied requirements for complements or specifiers. While S and CP are saturated categories projected from V, VP and V are not saturated.}\]
The verb *require* selects a *bse* CP complement, and this COMPS requirement is discharged at its mother VP: this satisfies the Head-Complement Rule. There is one issue here with respect to the percolation of the VFORM value: the CP must be *bse*, but this information comes from the head C, not from its complement S. One way to make sure this is to assume that the VFORM value of C is identical with that of its complement S, as represented in this lexical entry:

\[
\begin{array}{c}
\langle \text{that} \rangle \\
\text{HEAD} \\
\text{POS} \text{comp} \\
\text{VFORM } \text{[]} \\
\text{SPR} \\
\text{COMPS} \langle \text{S[VFORM } \text{[]]} \rangle \\
\end{array}
\]

This lexical information will then allow us to pass on the VFORM value of S to the head C and then be percolated up to the CP according to the HFP. This encodes the intuition that a complementizer ‘agrees’ with regard to VFORM value with its complement sentence.

There are also verbs which select a sequence of an NP followed by a CP as complements. NP and CP are abbreviations for feature structure descriptions that include the information [HEAD *noun*] and [HEAD *comp*], respectively:

\[
\begin{array}{c}
\text{(47)} \\
a. \text{Joe warned the class that the exam would be difficult.} \\
b. \text{We told Tom that he should consult an accountant.} \\
c. \text{Mary convinced me that the argument was sound.} \\
\end{array}
\]
The COMPS value of such verbs will be as in (48):

\[(48) \text{COMPS} \langle \text{NP, CP[VFORM}_{\text{fin}}] \rangle\]

In addition to the *that*-type of CP, there is an infinitive type of CP, headed by the complementizer *for*. Some verbs select this nonfinite CP as the complement:

\[(49) \quad \begin{align*}
&\text{a. Tom intends for Sam to review that book.} \\
&\text{b. John would prefer for the children to finish the oatmeal.}
\end{align*}\]

The data show that verbs like *intend* and *prefer* select an infinitival CP clause. The structure of (49a) is familiar, but now has a nonfinite VFORM value within it:

\[(50)\]

The structure given here means that the verb *intends* will have the following lexical information:

\[(51)\]
To fill out the analysis, we need explicit lexical entries for the complementizer for and for to, which we treat as an (infinitive) auxiliary verb. In fact, to has a distribution very similar to the finite modals auxiliaries such as will or must, differing only in the VFORM value.

(52) a. 

\[
\begin{array}{c}
\text{\{for\}} \\
\text{HEAD} \\
\text{COMPS \{S[VFORM inf]\}}
\end{array}
\]

b. 

\[
\begin{array}{c}
\text{\{to\}} \\
\text{HEAD} \\
\text{COMPS \{VP[VFORM bse]\}}
\end{array}
\]

Just like the complementizer that, for selects an infinitival S as its complement, sharing the VFORM value. The evidence that the complementizer for requires an infinitival S can be found from coordination data:

(53) a. For John to either [make up such a story] or [repeat it] is outrageous.  
   (coordination of bse VPs) 

b. For John either [to make up such a story] or [to repeat it] is outrageous.  
   (coordination of inf VPs) 

c. For [John to tell Bill such a lie] and [Bill to believe it] is outrageous.  
   (coordination of inf Ss)

Given that only like categories (constituents with the same label) can be coordinated, we can see that base VPs, infinitival VPs, and infinitival Ss are all constituents.

One thing to note here is that the verbs which select a CP[VFORM inf] complement can also take a VP[VFORM inf] complement:

(54) a. John intends to review the book.  
   b. John would prefer to finish the oatmeal.

By underspecifying the category information of complements, we can generalize this subcategorization information:

(55) 

\[
\begin{array}{c}
\text{\{intend\}} \\
\text{HEAD} | \text{POS \textit{verb}} \\
\text{COMPS \{VFORM inf\}}
\end{array}
\]

Since the specification [VFORM inf] is quite general, it can be realized either as CP[VFORM inf] or VP[VFORM inf].

However, this does not mean that all verbs behave alike: not all verbs can take variable complement types such as an infinitival VP or S. For examples, try, tend, hope, and others
select only a VP[inf] as attested by the data:

(56)  
   a. Tom tried to ask a question.  
   b. *Tom tried for Bill to ask a question.

(57)  
   a. Tom tends to avoid confrontations.  
   b. *Tom tends for Mary to avoid confrontations.

(58)  
   a. Joe hoped to find a solution.  
   b. *Joe hoped for Beth to find a solution.

Such subcategorization differences are hard to be predict just from the meaning of verbs: they are simple lexical specifications which language users need to learn.

There is another generalization that we need to consider with respect to the property of verbs that select a CP: most verbs that select a CP can at first glance select an NP, too:

(59)  
   a. John believed it/that he is honest.  
   b. John mentioned the issue to me/mentioned to me that the question is an issue.

Should we have two lexical entries for such verbs or can we have a simple way of representing such a pattern? To reflect such lexical patterns, we will assume that parts of speech come in families and can profitably be analyzed in terms of typed feature structures. The part-of-speech types we will assume form the hierarchy illustrated in (60):63

\[
\text{part-of-speech} \\
\quad \begin{array}{c}
\text{nominal} \\
\text{verb} \\
\text{adj} \\
\text{prep} \\
\ldots \\
\end{array} \\
\quad \begin{array}{c}
\text{noun} \\
\text{comp} \\
\end{array}
\]

The type nominal is thus a supertype of both noun and comp.64 In accordance with the basic properties of systems of typed feature structures, an element specified as [HEAD nominal] can be realized either as [HEAD noun] or [HEAD comp]. These will correspond to the phrasal types NP and CP, respectively.

The hierarchy implies that the subcategorization pattern of English verbs will refer to (at least) each of these types. For example, we can easily identify verbs whose subcategorization restrictions make reference to nominal, noun, and comp:

(61)  
   a. She pinched [his arm] as hard as she could.  
   b. *She pinched [that he feels pain].

(62)  
   a. We hope [that such a vaccine could be available in ten years].  
   b. *We hope [the availability of such a vaccine in ten years].

63The analysis given here is adopted from Kim and Sag (2006).
64The type nominal can also account for the fact that CPs behave like NPs in subject or object positions.
(63)  a. Cohen proved [the independence of the continuum hypothesis].
    b. Cohen proved [that the continuum hypothesis was independent].

The *part-of-speech* type hierarchy in (60) allows us to formulate simple lexical constraints that reflect these subcategorization patterns. That is, we can assume that English transitive verbs come in at least the following three varieties:

(64)  a. \[\text{ARG-ST} \langle \text{NP, NP[POS noun]}, \ldots \rangle\]
    b. \[\text{ARG-ST} \langle \text{NP, CP[POS comp]}, \ldots \rangle\]
    c. \[\text{ARG-ST} \langle \text{NP, [POS nominal]}, \ldots \rangle\]

In each class, the ARG-ST list specifies the dependent elements that the verbs select (in the order \(\langle\text{Subject, Direct Object, }\ldots\rangle\)). The POS value of a given element is the part-of-speech type that a word passes on to the phrases it projects.

### 5.4.2 Verbs Selecting a Clausal Subject

In addition to CP as a complement, we also find some cases where a CP is the subject of a verb:

(65)  a. [John] bothers me.
    b. [That John snores] bothers me.

(66)  a. [John] loves Bill
    b. *[That John snores] loves Bill.

The contrast here means that verbs like *bother* can have two realizations of the ARG-ST, whereas those like *love* allow only one:

(67)  a. \[
\begin{array}{l}
\text{SPR} \langle \text{[POS nominal]} \rangle \\
\text{COMPS} \langle \text{[NP]} \rangle \\
\text{ARG-ST} \langle 1, 2 \rangle
\end{array}
\]
    b. \[
\begin{array}{l}
\text{SPR} \langle \text{[NP]} \rangle \\
\text{COMPS} \langle \text{[NP]} \rangle \\
\text{ARG-ST} \langle 1, 2 \rangle
\end{array}
\]

These different realizations all hinge on the lexical properties of the given verb, and only some verb allow the dual realization described by (67)a.

A clausal subject is not limited to a finite *that*-headed CP, but there are other clausal types:

(68)  a. [That John sold the ostrich] surprised Bill.
    \(\text{(that-clause CP subject)}\)
    b. [(For John) to train his horse] would be desirable.
    \(\text{(infinitival CP or VP subject)}\)
    c. [That the king or queen be present] is a requirement on all Royal weddings.
    \(\text{(subjunctive that-clause CP subject)}\)
d. [Which otter you should adopt first] is unclear.  
\(\text{wh-question CP subject}\)

Naturally, each particular predicate dictates which kinds of subjects are possible, as in (68), and which are not, as in (69):

(69) a. *That Fred was unpopular nominated Bill.
    b. *That Tom missed the lecture was enjoyable.
    c. *For John to remove the mother is undeniable.
    d. *How much money Gordon spent is true.

For example, the difference between the two verbs \textit{nominate} and \textit{surprise} can be seen in these partial lexical entries:

\begin{align*}
(70) & \quad \text{a. } \begin{aligned}
& \langle \text{nominate} \rangle \\
& \text{VAL} \begin{bmatrix}
& \text{SPR} \quad \langle \text{NP} \rangle \\
& \text{COMPS} \quad \langle \text{NP} \rangle \\
& \text{ARG-ST} \quad \langle 1, 2 \rangle
\end{bmatrix}
\end{aligned} \\
& \quad \text{b. } \begin{aligned}
& \langle \text{surprise} \rangle \\
& \text{VAL} \begin{bmatrix}
& \text{SPR} \quad \langle \text{POS nominal} \rangle \\
& \text{COMPS} \quad \langle \text{NP} \rangle \\
& \text{ARG-ST} \quad \langle 1, 2 \rangle
\end{bmatrix}
\end{aligned}
\end{align*}

Unlike \textit{nominate}, the first argument of \textit{surprised} can be a \textit{nominal}. This means that its subject can be either an NP or a CP.

\section{Adjectives Selecting a Clausal Complement}

Like verbs, certain adjectives can also select CPs as their complements. For example, \textit{confident} and \textit{insistent} select a finite CP, whereas \textit{eager} selects an infinitival CP:

\begin{align*}
(71) & \quad \text{a. Tom is confident [that the elephants respect him].} \\
& \quad \text{b. Tom is insistent [that the witnesses be truthful].} \\
(72) & \quad \text{a. Tom seems eager [for her brother to catch a cold].} \\
& \quad \text{b. Tom seems eager [to catch a cold].}
\end{align*}

We can easily find more adjectives which select a CP complement:

\begin{align*}
(73) & \quad \text{a. I am ashamed that I neglected you.} \\
& \quad \text{b. I am delighted that Mary finished his thesis.} \\
& \quad \text{c. We are content for the cleaners to return the drapes next week.}
\end{align*}

The lexical entries for some adjectives are given in (74):
Such lexical entries, interacting with the Head-Complement Rule, the HeadSpecifier Rule, and the HFP, can license analyses such as (75), for (72b):

When the head adjective *eager* combines with its complement, VP[*inf*], it satisfies the HeadComplement Rule. The same rule allows the combination of the verb *seem* with its AP complement.

5.4.4 Nouns Selecting a Clausal Complement

Nouns can also select a CP complement, for example, *eagerness*:
These examples imply that *eagerness* will have the following lexical information:

\[
\begin{array}{|c|c|}
\hline
\text{HEAD} & \text{POS} \\
\hline
\langle \text{eagerness} \rangle & \text{noun} \\
\hline
\end{array}
\]

This lexical entry will allow a structure like the following:

\[
\begin{array}{c}
\text{NP} \\
\text{DP} \\
\text{John's} \\
\end{array}
\begin{array}{c}
\text{N'} \\
\left[ \begin{array}{c}
\text{N} \\
\left[ \begin{array}{c}
\text{COMPS} \\
\langle \text{eagerness} \rangle \\
\end{array} \right] \\
\end{array} \right] \\
\end{array}
\left[ \begin{array}{c}
\text{VP} \\
\text{to win the election} \\
\end{array} \right]
\end{array}
\]

One pattern that we can observe is that when a verb selects a CP complement, if there is corresponding noun, it also selects a CP:

\[
\begin{array}{c}
\text{(79) } \begin{array}{c}
\text{a. Bill alleged that Fred signed the check.} \\
\text{b. We believe that the directors were present.} \\
\text{c. We convinced him that the operation is safe.} \\
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\text{(80) } \begin{array}{c}
\text{a. the allegation that Fred signed the check} \\
\text{b. the belief that the directors were present} \\
\text{c. his conviction that the operation is safe} \\
\end{array}
\end{array}
\]

This shows us that the derivational process which derives a noun from a verb preserves the COMPS value of that verb.

A caution here is that not all nouns can of course select a CP complement:

\[
\begin{array}{c}
\text{(81) } \begin{array}{c}
\text{a. *his attention that the earth is round} \\
\text{b. *his article that the earth is flat} \\
\text{c. *the ignorance that James can play the flute} \\
\text{d. *the expertise that she knows how to bake croissants} \\
\end{array}
\end{array}
\]

These nouns cannot combine with a CP complement, indicating that they do not have CP in the value of COMPS.\(^{65}\)

\(^{65}\)Some nouns may have other kinds of complement, e.g., PP, as in *my ignorance [of French table manners]*.
5.4.5 Prepositions Selecting a Clausal Complement

In general, prepositions in English cannot select a CP complement.

(82)  a. *Alan is thinking about [that his students are eager to learn English].
      b. *Fred is counting on [for Tom to make an announcement].

However, wh-CPs, sometimes known as indirect questions, may serve as prepositional complements.

(83)  a. The outcome depends on [how many candidates participate in the election].
      b. Fred is thinking about [whether he should stay in Seoul].

These facts show us that indirect questions have some feature which distinguishes them from canonical that- or for-CPs, and makes them somehow closer to true nouns (for NP is the typical complement for a preposition).
5.5 Exercises

1. For each sentence, draw a tree diagram and give the COMPS value (including VFORM and PFORM value) for each lexical head.
   (i) a. The offer made Smith admire the administrators.
        b. John tried to make Sam let George ask Bill to keep delivering the mail.
        c. The soldiers must enforce Bill to make the baby be quiet.
        d. John enjoyed drawing trees for his syntax homework.
        e. The picture on the wall reminded him of his country.
        f. Free enterprise is compatible with American values and traditions.

2. Identify errors in the following sentences, focusing on the form values of verbs, adjectives, and nouns.
   (i) a. *Why don’t you leaving me concentrate on my work?
        b. *The general commended that all troops was in dress uniform.
        c. *My morning routine features swim free styles slowly for one hour.
        d. *You should avoid to travel in the rush hour.
        e. *You should attempt answering every question.
        f. *The authorities blamed Greenpeace with the bombing.
        g. *The authorities charged the students of the cheating.
        h. *Sharon has been eager finishing the book.
        i. *We respect Mary’s desire for becoming famous.
        j. *John referred from the building.
        k. *John died to heart disease.
        l. *John paid me against the book.

3. For each of the sentences in (ii), determine whether the italicized phrase has a present or a base as head. Do this by replacing the phrase with some phrase headed by are and the same phrase headed by be as in (i), and see which one sounds more acceptable.
   (i) a. We made them take the money.
        b. *We made them are rude.
        c. We made them be rude.
   (ii) a. Do not use these words in the beginning of a sentence.
        b. We know the witnesses seem eager to testify against the criminal.
        c. Jane isn’t sure whether the students keep the books.
        d. Why not try to catch the minnows?

4. Consider the following data and provide the lexical entries for not and never. In doing so, try to find a similarity (or similarities) between the two.
   (i) a. Kim regrets [never [having read the book]].
        b. We asked him [never [to try to read the book]].
        c. Duty made them [never [miss the weekly meeting]].
   (ii) a. Kim regrets [not [having read the book]].
b. We asked him [not [to try to read the book]].
c. Duty made them [not [miss the weekly meeting]].

5. Read the following text and provide the lexical entry for the underlined words. In doing so, try to specify the VFORM or PFORM value of the complement(s).

(i) The study of grammar helps us to communicate more effectively. Quite simply, if we know how English works, then we can make better use of it. For most purposes, we need to be able to construct sentences which are far more complicated than *David plays the piano. A knowledge of grammar enables us to evaluate the choices which are available to us during composition. In practice, these choices are never as simple as the choice between David plays the piano and *plays David piano the. If we understand the relationship between the parts of a sentence, we can eliminate many of the ambiguities and misunderstandings which result from poor construction. In the interpretation of writing, too, grammatical knowledge is often crucially important. The understanding of literary texts, for example, often depends on careful grammatical analysis. Other forms of writing can be equally difficult to interpret. Scientific and academic writing, for instance, may be complex not just in the ideas they convey, but also in their syntax. These types of writing can be difficult to understand easily without some familiarity with how the parts relate to each other. The study of grammar enables us to go beyond our instinctive, native-speaker knowledge, and to use English in an intelligent, informed way.66

6. Read the following carefully and correct the errors in the form value. Provide your reason for the correction.

(i) Syntax is the discipline that examining the rules of a language that dictate how the various parts of sentences gone together. While morphology looks at how individual sounds formed into complete words, syntax looks at how those words are formed for complete sentences. One part of syntax, calling inflection, deals with how the end of a word might changed to tell a listener or reader something about the role that word is playing. Regular verbs in English, for example, change their ending based for the tense the verb is representing in a sentence, so that when we see Robert danced, we know the sentence is in the past tense, and when we see Robert is dancing, we know it is not. As another example, regular nouns in English become plural simply by adding an s to the end. Cues like these play a large role for helping hearers understanding sentences.67

67from http://www.wisegeek.com/what-is-syntax.htm
Noun Phrases and Agreement

6.1 Classification of Nouns

Nouns not only represent entities like people, places, or things, but also denote abstract and intangible concepts such as happiness, information, hope, and so forth. Such diversity of reference renders it difficult to classify nouns solely according to their meanings. The following chart shows the canonical classification of nouns taking into account semantic differences, but also considering their formal and grammatical properties:

(1) Types of Nouns in English:

| common noun | countable | desk, book, difficulty, remark, etc. |
| uncountable | butter, gold, music, furniture, laziness, etc. |
| proper noun | Seoul, Kyung Hee, Stanford, Palo Alto, January, etc. |
| pronoun | personal | he, himself, his, etc. |
| | relative | that, which, what, who, whom, etc. |
| | interrogative | who, where, how, why, when, etc. |
| | indefinite | anybody, everybody, somebody, nobody, anywhere, etc. |

As shown here, nouns fall into three major categories: common nouns, proper nouns, and pronouns. One important aspect of common nouns is that they are either count or non-count. Whether a noun is countable or not does not fully depend on its reference; examples like difficulty which is mass (non-count) but difficulties which is count suggest how subtle the distinction can be, and we have nouns like furniture/*furnitures which are only mass and chair/chairs which are only count.

Proper nouns denote specific people or places and are typically uncountable. Common nouns and proper nouns display clear contrasts in terms of the combinatorial possibilities with determiners as shown in the following chart:
Proper nouns do not combine with any determiner, as can be seen from the chart. Meanwhile, count nouns have singular and plural forms (e.g., *a book and books), whereas uncountable nouns combine only with some or the. As noted in Chapter 1, some common nouns may be either count or non-count, depending on the kind of reference they have. For example, cake can be countable when it refers to a specific one as in *I made a cake, but can be noncountable when it refers to (cake in general) as in I like cake.

Together with verbs, nouns are of pivotal importance in English, forming the semantic and structural components of sentences. This chapter deals with the structural, semantic, and functional dimensions of NPs, with focus on the agreement relationships of nouns with determiners and of noun phrases with verbs.

### 6.2 Syntactic Structures

#### 6.2.1 Projection of Countable Nouns

As noted before, common nouns can have a determiner as a specifier, unlike proper and pronouns. In particular, count nouns cannot be used without a determiner when they are singular:

(3) a. *Book is available in most countries.
    
    b. *Student studies English for 4 hours a day.

(4) a. Rice is available in most countries.
    
    b. Students study English for 4 hours a day.

We can see here that mass nouns, or plural count nouns, are fully grammatical as bare nouns phrases.68

This has the consequence for our grammatical analysis that singular countable nouns like student must select a determiner as specifier. As we have seen in Chapters 2 and 4, there are various kinds of expressions which can serve as determiners including a, an, this, that, any, some, his, how, which, some, no, much, few, . . . as well as a possessive phrase:

(5) a. His friend learned dancing.

---

68 The style of English used in headlines does not have this restriction, e.g., Student discovers planet, Army receives high-tech helicopter.
b. John’s friend learned dancing.

c. The president’s bodyguard learned surveillance.

d. The King of Rock and Roll’s records led to dancing.

These possessive NPs John’s or the president’s are not determiners, because they are phrases. We take such phrases as DPs headed by the Det’s (after Abney 1987). Let’s consider the lexical entries for the relevant words:

(6)

a. \[
\begin{array}{c|c|c|c|c|}
\text{his} & \text{det} & \text{POS} & \text{HEAD} & \text{SPR} \\
\text{COMPS} & & & & \\
\end{array}
\]

b. \[
\begin{array}{c|c|c|c|c|}
\text{John} & \text{noun} & \text{POS} & \text{HEAD} & \text{SPR} \\
\text{COMPS} & & & & \\
\end{array}
\]

c. \[
\begin{array}{c|c|c|c|c|}
\text{‘s} & \text{det} & \text{POS} & \text{HEAD} & \text{SPR} \\
\text{COMPS} & & & & \\
\end{array}
\]

d. \[
\begin{array}{c|c|c|c|c|}
\text{friend} & \text{DP} & \text{POS} & \text{HEAD} & \text{SPR} \\
\text{COMPS} & & & & \\
\end{array}
\]

These lexical entries will project NP structures like the following:

(7) a.

```
NP
   | N'
   |   | SPR (DP)
   |   | COMPS ( )
Det
|   | SPR (DP)
|   | COMPS ( )
his friend
```
Keen readers may have noticed that no rules that we have covered so far license the projection of N to N': this projection has only the head element. To be a more precise and allow this kind of vacuous projection, the grammar needs the following Head-Only Rule:

(8) Head-Only Rule:
\[ XP[\text{VAL}] \rightarrow X[\text{VAL}] \]

This rule will also license a lexical element to project into a phrase, either X' or XP, with no change in the VAL (SPR and COMPS) values, as illustrated in the following:

(9) NP
\[ \begin{array}{c}
\text{VAL} \\{ \text{SPR} \langle \rangle \} \\
\text{COMPS} \langle \rangle \\
\end{array} \]

VP
\[ \begin{array}{c}
\text{VAL} \\{ \text{SPR} \langle \\text{NP} \rangle \} \\
\text{COMPS} \langle \rangle \\
\end{array} \]

Applied to nouns, the Head-Only Rule will predict examples like the following in which bare plural or mass nouns are projected into a fully-formed NPs:

(10) a. Students ran.

 b. John wants to buy cookies.

 c. Advice is cheap.
(11) a. *Student ran.
    b. *John wants to buy cookie.
    c. *An advice is cheap.

In fact, singular countable nouns as well as uncountable nouns can be used without a specifier when they are used as a predicative expression, as denoting a generic individual, or as representing a habitual activity:

(12) a. He is president of the university. (predicative)
    b. Pepper makes people sneeze. (generic)
    c. Sally brews beer. (habitual)

(13) a. Your friends are Europeans. (predicative)
    b. Ostriches are large flightless birds. (generic)
    c. John sells shoes. (habitual)

In these usages, the nouns will directly project to a full NP without combining with any complement, modifier, or specifier.

6.2.2 Projection of Pronouns

The core class of pronouns in English includes at least three main subgroups:

(14) a. Personal pronouns: I, you, he, she, it, they, we
    b. Reflexive pronouns: myself, yourself, himself, herself, itself
    c. Reciprocal pronoun: each other

Personal pronouns refer to specific persons or things and take different forms to indicate person, number, gender, and case. They participate in agreement relations with their antecedent, the phrase which they are understood to be referring to (indicated by the underlined parts of the examples in (15)).

(15) a. After reading the pamphlet, Judy threw it/*them into the garbage can.
    b. I got worried when the neighbors let their/*his dogs out.

Reflexive pronouns are special forms which typically are used to indicate a reflexive activity or action, which can include mental activities.

(16) a. After the party, I asked myself why I had faxed invitations to everyone in my office building.
    b. Edward usually remembered to send a copy of his e-mail to himself.

As noted earlier, these personal or reflexive pronouns neither take a determiner nor combine with an adjective except in very restricted constructions.\(^{69}\)

\(^{69}\) These restricted constructions involve some indefinite pronouns (e.g., a little something, a certain someone)
6.2.3 Projection of Proper Nouns

Since proper nouns usually refer to something or someone unique, they do not normally take a plural form and cannot occur with a determiner:


However, proper nouns can be converted into countable nouns when they refer to a particular individual or type of individual:

(18)  a. No John Smiths attended the meeting.
     b. This John Smith lives in Seoul.
     c. There are three Davids in my class.
     d. It’s nothing like the America I remember.
     e. My brother is an Einstein at maths.

In such cases, proper nouns are converted into common nouns, may select a specifier, and take other nominal modifiers.

6.3 Agreement Types and Morpho-syntactic Features

6.3.1 Noun-Determiner Agreement

Common nouns in English participate in three types of agreement. First, they are involved in determiner-noun agreement. All countable nouns are used either as singular or plural. When they combine with a determiner, there must be an agreement relationship between the two:

(19)  a. this book/that book
     b. *this books/*that books/these books/those books
     c. *few dog/few dogs

The data in turn means that the head noun’s number value should be identical to that of its specifier, implying that determiners and nouns have NUM (number) information as their syntactic AGR (agreement) value:

(20)    [⟨a⟩]
        [HEAD
        POS det
        AGR | NUM sing]
        [⟨book⟩]
     a. HEAD
        POS noun
        AGR  | NUM sing
        SPR
        ⟨⟩
        COMPS
        ⟨⟩

b. HEAD
   POS noun
   AGR  | NUM sing
   SPR
   ⟨DP[NUM sing]⟩
   COMPS
   ⟨⟩

Common nouns thus impose a specific NUM value on the specifier:
The singular noun *book* selects a singular determiner like *a*. Notice that the AGR value on the head noun *book* is passed up to the whole NP, marking the whole NP as singular, so that it can combine with a singular VP, if it is the subject.

In addition, there is nothing preventing a singular noun from combining with a determiner which is not specified at all for a NUM value:

(22)  

Determiners like *the, no* and *my* are not specified for a NUM value. Formally, their NUM value is underspecified as *num(ber)*. That is, the grammar of English has the underspecified value *num* for the feature NUM, with two subtypes *sing(ular)* and *pl(ural):*

(23)  

Given this hierarchy, nouns like *book* requiring a singular Det can combine with determiners like *the* whose AGR value is *num*. This is in accord with the grammar since the value *num* is a supertype of *sing.*
6.3.2 Pronoun-Antecedent Agreement

As noted earlier, a second type of agreement is pronoun-antecedent agreement, as indicated in (24).

(24) a. If John wants to succeed in corporate life, he/she has to know the rules of the game.
   b. The critique of Plato’s Republic was written from a contemporary point of view.

The pronoun he or it here needs to agree with its antecedent not only with respect to the number value but also with respect to person (1st, 2nd, 3rd) and gender (masculine, feminine, or neuter) values too. This shows us that nouns have also information about person and gender as well as number in the AGR values:

As we have briefly shown, nouns have NUM, PER(SON), and GEN(DER) for their AGR values. The PER value can 1st, 2nd or 3rd; the GEN value can be masc(uline), fem(inine) or neut(er).

6.3.3 Subject-Verb Agreement

The third type of agreement is subject-verb agreement, which is one of the most important phenomena in English syntax. Let us look at some slightly complex examples:

(26) a. The characters in Shakespeare’s Twelfth Night lives/live in a world that has been turned upside-down.
   b. Students studying English read/reads Conrad’s Heart of Darkness while at university.

As we can see here, the subject and the verb need to have an identical number value; and the person value is also involved in agreement relations, in particular when the subject is a personal pronoun:

(27) a. You are/is the only person that I can rely on.
   b. He is/are the only person that I can rely on.
These facts show us that a verb lexically specifies the information about the number as well as
person values of the subject that it selects for.

To show how the agreement system works, we will use some simpler examples:

(28) a. The boy swims/*swim.
b. The boys swim/*swims.

English verbs will have at least the following selectional information:

(29) $$\begin{align*}
\text{HEAD} & \quad \begin{bmatrix}
\text{POS} \quad \textit{verb} \\
\text{VFORM} \quad \textit{pres}
\end{bmatrix} \\
\text{SPR} & \quad \begin{bmatrix}
\text{NP} \\
\text{PER} \quad \text{3rd} \\
\text{NUM} \quad \text{sing}
\end{bmatrix}
\end{align*}$$

The present-tense verb \textit{swims} thus specifies that its subject (SPR’s value) carries a 3rd singular
AGR information. This lexical information will license a structure like the following:

(30) \begin{align*}
S & \quad \begin{cases}
\text{NP} \\
\text{PER} \quad \text{3rd} \\
\text{NUM} \quad \text{sing}
\end{cases} \\
\text{VP} & \quad \begin{cases}
\text{SPR} \\
\text{NP} \\
\text{PER} \quad \text{3rd} \\
\text{NUM} \quad \text{sing}
\end{cases}
\end{align*}

The acute reader may have noticed that there are similarities between noun-determiner agree-
ment and subject-verb agreement, that is, in the way that agreement works inside NP and inside
S. Both NP and S require agreement between the head and the specifier. Reflecting this observation, we can modify the Head-Specifier Rule as following:

(31) Head-Specifier Rule:
$$\text{XP} \rightarrow \text{SPR}[\text{AGR} \downarrow \text{H}[\text{AGR} \uparrow]]$$

This revised rule guarantees that English head-specifier phrases require their head and specifier to share agreement features.

6.4 Semantic Agreement Features

6.4.1 Morpho-syntactic and Index Agreement

What we have seen so far is that the morphosyntactic AGR values of noun or verb can be specified, and may be inherited by phrases built out of them. However, consider now the following examples:

(32) a. [The hash browns at table nine] are/*is getting cold.
   b. [The hash browns at table nine] is/*are getting angry.

When (32b) is spoken by a waiter to another waiter, the subject refers to a person who ordered hash browns. A somewhat similar case is found in (33):

(33) King prawns cooked in chili salt and pepper was very much better, a simple dish succulently executed.

Here the verb form was is singular to agree with the dish being referred to, rather than with a plurality of prawns. If we simply assume that the subject phrase inherits the morphosyntactic agreement features of the head noun (hash) browns in (32b) and (King) prawns in (33), and requires that these features match those of the verb, we would not expect the singular verb form to be possible at all in these examples.

In the interpretation of a nominal expression, it must be anchored to an individual in the situation described. We call this anchoring value the noun phrase’s ‘index’ value. The index of hash browns in (32a) must be anchored to the plural entities on the plate, whereas that of hash browns in (32b) is anchored to a customer who ordered the food.

English agreement is not purely morpho-syntactic as described in the sections above, but context-dependent in various ways, via the notion of ‘index’ that we have just introduced. Often what a given nominal refers to in the real world is important for agreement – index agreement. Index agreement involves sharing of referential indices, closely related to the semantics of a nominal, and somewhat separate from the syntactic agreement feature AGR. This then requires us to distinguish the morphological AGR value and semantic (SEM(ANTIC)) IND(EX) value. So, in addition to the morphological AGR value introduced above, each noun will also have a semantic IND value representing what the noun refers to in the actual world.
The lexical entry for boy indicates that it is syntactically a singular noun (through the feature AGR) and semantically also denotes a singular entity (through the feature IND). And the verb will place a restriction on its subject’s IND value rather than its morphological AGR value:

(35)  
\[
\langle \text{swims} \rangle \\
\begin{array}{c}
\text{SYN} \\
\text{HEAD} \\
\text{VAL} \\
\text{SEM}
\end{array}
\begin{array}{c}
\text{POS verb} \\
\text{AGR | NUM sing} \\
\left( \text{NP[IND | NUM sing]} \right) \\
\text{IND s0}
\end{array}
\]

The lexical entry for swims in (35b) indicates that it is morphologically marked as singular (the AGR feature) whereas it selects a subject to be linked to a singular entity in the context (by the feature IND). Different from nouns, the verb’s own IND value is a situation index (s0) in which the individual referred to through the SPR value is performing the action of swimming. If the referent of this subject (its IND value) does not match, we would generate an ungrammatical example like *The boys swims:

---

70 The IND value of a noun will be an individual index (i, j, k, etc) whereas that of a verb or predicative adjective will be a situation index such as s0, s1, s2, etc.
In the most usual cases, the AGR and IND value are identical, but they can be different, as in examples like (32b). This means that depending on the context, hash browns can have different IND values:

\[(37)\]

\[
\begin{align*}
\text{(a)} & : \langle \text{hash browns} \rangle & \langle \text{hash browns} \rangle \\
\text{SYN} & : \text{HEAD} \quad \text{POS} \quad \text{noun} & \text{AGR} \quad \text{NUM} \quad \text{pl} \\
\text{SEM} & : \text{IND} \quad \text{NUM} \quad \text{pl} \\
\text{(when referring to the food itself)} \\
\text{(b)} & : \langle \text{hash browns} \rangle & \langle \text{hash browns} \rangle \\
\text{SYN} & : \text{HEAD} \quad \text{POS} \quad \text{noun} & \text{AGR} \quad \text{NUM} \quad \text{pl} \\
\text{SEM} & : \text{IND} \quad \text{NUM} \quad \text{sing} \\
\text{(when referring to a customer, or to a dish)}
\end{align*}
\]

In the lexical entry (37b), the AGR’s NUM value is plural but its IND’s NUM value is singular. As shown by (32), the reference hash browns can be transferred from cooked potatoes to the customer who ordered it. This means that given an appropriate context, there could be a mismatch between the morphological form of a noun and the index value that the noun refers to.

### 6.4.2 More on Semantic Aspects of Agreement

Here we introduce one more complex aspect of English agreement patterns. Consider the examples in (38):

---

As indicated here, the lexical expression now has two features SYN (SYNTAX) and SEM (SEMANTICS). The feature SYN includes HEAD and SPR and COMPS. The feature SEM is for semantic information. As our discussion goes on, we will add more to this part.
(38) a. [Five pounds] is/*are a lot of money.
b. [Two drops] deodorizes/*deodorize anything in your house.
c. [Fifteen dollars] in a week is/*are not much.
d. [Fifteen years] represents/*represent a long period of his life.
e. [Two miles] is/*are as far as they can walk.

In all of these examples with measure nouns, the plural subject combines with a singular verb. An apparent conflict arises from the agreement features of the head noun. For proper agreement inside the noun phrase, the head noun has to be plural, but for subject-verb agreement the noun has to be singular.

A similar mismatch is also found in cases with terms for social organizations or collections, as in (39) and (40):72

(39) a. [This/*these government] has/*have broken its promises.
b. [This/*these government] have/*has broken their promises.

(40) a. [This/*these England team] have/*has put themselves in a good position to win the championship.
b. [This/*these England team] *have/has put itself in a good position to win the championship.

The head noun has to be singular so that it can combine with a singular determiner. But the conflicting fact is that the singular noun phrase can combine even with a plural verb as well as a singular verb. Since the only possible number value of the determiner is singular for the head noun, the head noun cannot be anchored to plural entities unless we allow the mode of individuation to be changeable even within the same sentence domain.

What this indicates is that subject-verb agreement and noun-specifier agreement are different. In fact, English determiner-noun agreement is only a reflection of morpho-syntactic agreement features between determiner and noun, whereas both subject-verb agreement and pronoun-antecedent agreement are index-based agreement. This is represented in (41), and shown by the example in (42), where the underlined parts have singular agreement with four pounds, which is internally plural.

(41) Morpho-syntactic agreement (AGR)

\[ \text{Det} \quad \text{head-noun} \quad \text{verb} \quad \ldots \]

Index agreement (IND)

(42) [Four pounds] was quite a bit of money in 1950 and it was not easy to come by.

Given the separation of the morphological AGR value and the semantic IND value, nothing blocks mismatches between the two (AGR and IND) as long as all the other constraints are

72The acceptability of some of these examples varies in different varieties of English; British English typically allows more of the mismatching type of example.
satisfied. Consider the example in (38). The nouns *pounds* and *drops* here are morphologically plural and thus must select a plural determiner, as argued so far. But when these nouns are anchored to the group as a whole – that is, conceptualized as referring to a single measure, the index value has to be singular, as represented in (43).

(43) \[
\begin{array}{c}
\langle \text{pounds} \rangle \\
\text{SYN} \\
\text{HEAD} \\
\text{POS noun} \\
\text{AGR } \square | \text{NUM pl} \\
\text{SPR } \langle \text{DP AGR } \square \rangle \\
\text{SEM | IND | NUM sing}
\end{array}
\]

As indicated in the lexical entry (43), the morpho-syntactic number value of *pounds* is plural whereas the index value is singular. In the present analysis, this would mean that *pounds* will combine with a plural determiner but with a singular verb. This is possible, as noted earlier in section 2, since the index value is anchored to a singular individual in the context of utterance. The present analysis thus generates the following structure for the sentence (38a):

(44) S

\[
\begin{array}{c}
\mathbb{NP} \\
\text{AGR } \square \\
\text{IND } \square \\
\text{Det} \\
\text{AGR } \square | \text{NUM pl} \\
\text{IND } \square
\end{array}
\]

\[
\begin{array}{c}
\mathbb{VP} \\
\text{SPR } \langle \mathbb{NP} \rangle \\
\text{V} \\
\text{AGR } \square \\
\text{IND } \square
\end{array}
\]

\[
\begin{array}{c}
\mathbb{NP} \\
\text{AGR } \square \\
\text{IND } \square
\end{array}
\]

Now consider examples with nouns like *government*, repeated here:

(45) a. [This government] dislike(s) change.
    b. *[These government] dislike(s) change.

(46) a. [This committee] has/have decided.
    b. *[These committee] sat late.
(45b) is ruled out because of the number mismatch between *these* and *government*. In (45a), the verb can be either singular or plural. This is possible since the index value of the subject can be anchored either to a singular or to plural kind of entity. More precisely, we could represent the relevant information of the expressions participating in these agreement relationships as in (47).

\[
\begin{align*}
\text{(47) a.} & \quad \begin{array}{l}
\langle \text{this} \rangle \\
\text{HEAD} \quad \begin{array}{ll}
\text{POS} & \text{det} \\
\text{AGR} & \text{NUM sing}
\end{array}
\end{array} \\
\text{b.} & \quad \begin{array}{l}
\langle \text{government} \rangle \\
\text{SYN} \quad \begin{array}{ll}
\text{HEAD} \quad \begin{array}{ll}
\text{POS} & \text{noun} \\
\text{AGR} & \text{NUM sing}
\end{array}
\end{array}
\end{array}
\end{align*}
\]

As represented in (47a) and (47b), *this* and *government* agree each other in terms of the morpho-syntactic agreement number value whereas the index value of *government* is what matters for subject-verb agreement. This in turn means that when *government* refers to the individuals in this given group, the whole NP *this government* carries an plural index value. This then allows the NP *this government* to combine even with a plural VP *dislike changes*.

Now consider the examples (40) with pronoun-antecedent agreement.

\[
\begin{align*}
\text{(48) a.} & \quad \text{[This England team] now puts [itself/*themselves] in a good position to win the championship.} \\
\text{b.} & \quad \text{[This England team] now put [themselves/*itself] in a good position to win the championship.}
\end{align*}
\]

The point here is that the number value of the verb matches that of the reflexive pronoun *itself* and *themselves*. Pronoun-antecedent agreement is also index-based, rather than morpho-syntax-based. Given a simple Binding Condition specifying that a reflexive pronoun such as *himself, itself, themselves* has to be bound by a preceding argument of the same verb in the argument structure (ARG-ST), the grammar can predict the contrast here. Consider the ARG-ST of the main verb *put*:

\[
\begin{align*}
\text{(49) } & \quad \begin{array}{l}
\langle \text{put} \rangle \\
\text{ARG-ST} \quad \langle \text{NP}, \text{NP[anaphor]}_{i/sj}, \text{PP} \rangle
\end{array}
\end{align*}
\]

The verb *put* selects for three arguments. If the second argument is an anaphor, it must be bound by a preceding argument with respect to its IND value in accordance with the assumed Binding

---

73 These forms such as *himself, myself, itself* are sometimes called ‘anaphors’, or sometimes simply ‘reflexives’. See Exercise 7 for further discussion.
Condition. This means that in (48a) the head noun *team* must have a singular index value for subject agreement since the verb is singular. Any reflexive noun in the same argument structure would have to have a singular index value too. Meanwhile in (48b), the verb is plural, implying that the subject is anchored to individuals constituting a group. This mode of individuation cannot be changed, thus requiring a 3rd-person plural reflexive pronoun.

### 6.5 Partitive NPs and Agreement

#### 6.5.1 Basic Properties

With regard to the NP-internal elements between which we may find instances of agreement, there are two main types of NP in English: simple NPs and partitive NPs, shown in (50) and (51) respectively.

\[
\begin{align*}
(50) & \quad \text{a. some objections} \\
& \quad \text{b. most students} \\
& \quad \text{c. all students} \\
& \quad \text{d. much worry} \\
& \quad \text{e. many students} \\
& \quad \text{f. neither cars}
\end{align*}
\]

\[
\begin{align*}
(51) & \quad \text{a. some of the objections} \\
& \quad \text{b. most of the students} \\
& \quad \text{c. all of the students} \\
& \quad \text{d. much of her worry} \\
& \quad \text{e. many of the students} \\
& \quad \text{f. neither of the cars}
\end{align*}
\]

As in (51), the partitive phrases have a quantifier followed by an *of*-phrase, designating a set with respect to which certain individuals are quantified. In terms of semantics, these partitive NPs are different from simple NPs in several respects.

First, the lower NP in partitive phrases must be definite; and in the *of*-phrase, no quantificational NP is allowed, as shown in (52):

\[
\begin{align*}
(52) & \quad \text{a. Each student vs.*each of students} \\
& \quad \text{b. Some problems vs.*some of many problems}
\end{align*}
\]

Second, not all determiners with quantificational force can appear in partitive constructions. As shown in (53), determiners such as *the, every* and *no* cannot occupy the first position:

\[
\begin{align*}
(53) & \quad \text{a. *the of the students vs. the students} \\
& \quad \text{b. *every of his ideas vs. every idea} \\
& \quad \text{c. *no of your books vs. no book(s)}
\end{align*}
\]

Third, simple NPs and partitive NPs have different restrictions relative to the semantic head. Observe the contrast between (54) and (55):
(54)  a. She doesn’t believe much of that story.
b. We listened to as little of his speech as possible.
c. How much of the fresco did the flood damage?
d. I read some of the book.

(55)  a. *She doesn’t believe much story.
b. *We listened to as little speech as possible.
c. *How much fresco did the flood damage?
d. *I read some book.

The partitive constructions in (54) allow a mass (non-count) quantifier such as much, little and some to cooccur with a lower of-NP containing a singular count noun. But as we can see in (55), the same elements serving as determiners cannot directly precede such nouns.

Another difference concerns lexical idiosyncrasies.

(56)  a. One of the people was dying of thirst.
b. Many of the people were dying of thirst.

(57)  a. *One people was dying of thirst.
b. Many people were dying of thirst.

The partitives can be headed by quantifiers like one and many, as shown in (56) and (57) but unlike many, one cannot serve as a determiner when the head noun is collective as in (57a).

What the observations we have seen so far suggest is that cannot simply derive partitive constructions from simple noun phrases. The two constructions induce quite different lexical and syntactic properties that no independently motivated transformation mechanisms can capture.

6.5.2 Two Types of Partitive NPs

We classify partitive NPs into two types based on the agreement facts, and call them Type I and Type II. In Type I, the number value of the partitive phrase is always singular:

(58) Type I:
   a. Each of the suggestions is acceptable.
b. Neither of the cars has air conditioning.
c. None of these men wants to be president.

In Type II, the number value depends on the head noun inside the of-NP phrase.

(59) Type II:
   a. Most of the fruit is rotten.
b. Most of the children are here.
c. Some of the soup needs more salt.
d. Some of the diners need menus.
e. All of the land belongs to the government.
f. All of these cars belong to me.
As shown in (59), when the NP following the preposition *of* is singular or uncountable, the main verb is singular. When the NP is plural, the verb is also plural. From a semantic perspective, we see that the class of quantificational indefinite pronouns including *some, half, most* and *all* may combine either singular or plural verbs, depending upon the reference of the *of*-NP phrase. If the meaning of these phrases is about how much of something is meant, the verb is singular; but if the meaning is about how many of something is meant, the verb is plural. The expressions in (60) also exhibit similar behavior in terms of agreement.

(60) half of, part of, the majority of, the rest of, two-thirds of, a number of (but not the number of)

An effective way of capturing the relations between Type I and Type II constructions involves to the lexical properties of the quantifiers. First, Type I and Type II involve pronominal forms serving as the head of the constructions, which select an *of*-NP inside which the NP is definite:

(61) a. *neither of students, *some of water
   b. neither of the two linguists/some of the water

However, we know that the two types are different in terms of agreement: the pronouns in the Type I construction are lexically specified to be singular whereas the number value for Type II comes from inside the selected PP.

A slight digression is in order. It is easy to see that there are prepositions whose functions are just grammatical markers.

(62) a. John is in the room.
   b. I am fond of him.

The predicative preposition *in* here selects two arguments *John* and *the room*. Meanwhile, the preposition *of* has no predicative meaning, but just functions as a marker to the argument of *fond*. As for the PPs headed by these markers, as in the partitive construction, their semantic features are identical with the prepositional object NP. There is no semantic difference (such as definiteness effect represented as the feature DEF in the present system) between the PP *of him* and the NP *him*.

Within the complement PP, the agreement or index features of an NP such as *of him* and those of the internal *him* are identical. We show this in (63) by sharing the SEM value of the NP with that of the PP; this will also share any definiteness information from the NP to the PP:
Given this basic part of the analysis, we can lexically encode the similarities and differences between Type I and Type II in a simple manner:

(64) a. 

\[
\begin{align*}
&\langle \text{neither} \rangle \\
&\text{HEAD} [\text{POS noun}] \\
&\quad [\text{AGR | NUM sing}] \\
&\text{COMPS} \langle PP [\text{PFORM of}] \rangle \\
&\quad \langle \text{DEF +} \rangle \\
\end{align*}
\]

b. 

\[
\begin{align*}
&\langle \text{some} \rangle \\
&\text{HEAD} [\text{POS noun}] \\
&\quad [\text{AGR | NUM 1}] \\
&\text{COMPS} \langle PP [\text{PFORM of}] \rangle \\
&\quad \langle \text{DEF +} \rangle \\
&\quad [\text{AGR | NUM 1}] \\
\end{align*}
\]

(64) shows that both Type I *neither* and Type II *some* are lexically specified to require a PP complement whose semantic value includes the definite (DEF) feature (with the value +). This will account for the contrast in (61). However, the two types are different in terms of their AGR’s NUM value. The NUM value of Type I *neither* is singular, whereas that of Type II is identified with the PP’s NUM value which is actually coming from its prepositional object NP. Showing these differences in the syntactic structures, we have the alternatives in (65):
As shown in (65a), for Type I, it is *neither* which determines the NUM value of the whole NP phrase. However, for Type II, it is the NP *the students* which determines the NUM value of the whole NP.

We can check a few of the consequences of these different specifications in the two Types. Consider the contrast in (66):

(66) a. many of the/those/her apples
    b. *many of some/all/no apples

(66)b is ungrammatical since *many* requires an *of*-PP phrase whose DEF value is positive.

This system also offers a simple way of dealing with the fact that quantifiers like *each* affect the NUM value as well as the countability of the *of*-NP phrase. One difference between Type I and Type II is that Type I selects a plural *of*-NP phrase whereas Type II has no such restriction. This is illustrated in (67) and (68).

(67) Type I:
    a. one of the suggestions/*the suggestion/*his advice
    b. each of the suggestions/*the suggestion/*his advice
    c. neither of the students/*the student/*his advice

(68) Type II:
    a. some of his advice/students
b. most of his advice/students
c. all of his advice/students

The only additional specification we need for Type I pronouns relates to the NUM value on the PP’s complement as given in (69):

\[
\begin{align*}
\langle \text{each} \rangle \\
\text{HEAD} \quad \begin{bmatrix} \text{POS noun} \\
\text{AGR} \mid \text{NUM sing} \end{bmatrix} \\
\text{COMPS} \quad \begin{bmatrix} \text{PP} \\
\text{DEF} + \text{NUM pl} \end{bmatrix}
\end{align*}
\]

We see that quantifiers like *each* select a PP complement whose NUM value is plural.

Type II pronouns do not have such a requirement on the PP complement – note that all the examples in (70) are acceptable, in contrast to those in (71) (cf. Baker 1995):

(70) a. Most of John’s boat has been repainted.
    b. Some of the record contains evidence of wrongdoing.
    c. Much of that theory is unfounded.
(71) a. *Each of John’s boat has been repainted.
    b. *Many of the record contained evidence of wrongdoing.
    c. *One of the story has appeared in your newspaper.

The contrast here indicates that Type II pronouns can combine with a PP whose inner NP is singular. This is simply predicted since our analysis places no restriction on the NUM value of the inner NP.

We are also in a position now to understand some differences between simple NPs and partitive NPs. Consider the following examples:

(72) a. many dogs/*much dog/the dogs
    b. much furniture/*many furniture/the furniture
(73) a. few dogs/*few dog/*little dogs/*little dog
    b. little furniture/*little furnitures/*few furniture/*few furnitures

The data here indicate that in addition to the agreement features we have seen so far, common nouns also place a restriction on the countability value of the selected specifier. Specifically, a countable noun selects a countable determiner as its specifier. To capture this agreement restriction, we introduce a new feature COUNT (COUNTABLE):
The lexical specification on a countable noun like *dogs requires its specifier to be [COUNT +], to prevent formations like *much dogs. This in turn means that determiners must also carry the feature COUNT:

\[
\begin{align*}
(74) & \quad \begin{cases}
\langle \text{dogs} \rangle \\
\langle \text{furniture} \rangle
\end{cases} \\
\text{a. } & \begin{cases}
\text{HEAD} | \text{POS noun} \\
\text{SPR} \langle \text{DP}[\text{COUNT +}] \rangle
\end{cases} \\
\text{b. } & \begin{cases}
\text{HEAD} | \text{POS noun} \\
\text{SPR} \langle \text{DP}[\text{COUNT } -] \rangle
\end{cases}
\end{align*}
\]

The pronoun *many requires a PP complement whose inner NP is plural, whereas much does not.

\[
\begin{align*}
(75) & \quad \begin{cases}
\langle \text{many} \rangle \\
\langle \text{the} \rangle \\
\langle \text{little} \rangle
\end{cases} \\
\text{a. } & \begin{cases}
\text{HEAD} | \text{POS det} \\
\text{COUNT +}
\end{cases} \\
\text{b. } & \begin{cases}
\text{HEAD} | \text{POS det} \\
\text{COUNT bool}
\end{cases} \\
\text{c. } & \begin{cases}
\text{HEAD} | \text{POS det} \\
\text{COUNT } -
\end{cases}
\end{align*}
\]

The pronoun many requires a PP complement whose inner NP is plural, whereas much does not.
6.5.3 Measure Noun Phrases

There are also so-called ‘measure noun phrase’ constructions, which are similar to partitive constructions. Consider the following contrast:

(79)  a. one pound of those beans  
      b. three feet of that wire  
      c. a quart of Bob’s cider  

(80)  a. one pound of beans  
      b. three feet of wire  
      c. a quart of cider  

Notice here that (79) is a kind of partitive construction whereas (80) just measures the amount of the NP after of. As the examples show, measure noun phrases do not require a definite article, which is not an option for the true partitive constructions, repeated here:

(81) *many of beans, *some of wire, *much of cider, *none of yogurt, *one of strawberries  

In addition, there are several more differences between partitive and measure noun phrases. For example, measure nouns cannot occur in simple noun phrases. They obligatorily require an of-NP phrase:

(82)  a. *one pound beans vs. one pound of beans  
      b. *three feet wire vs. three feet of wire  
      c. *a quart cider vs. a quart of cider  

Further, unlike partitive constructions, measure noun phrases require a numeral as their specifier:

(83)  a. *one many of the books, *several much of the beer  
      b. one pound of beans, three feet of wire  

Further complications arise due to the existence of defective measure noun phrases. Consider the following examples:

(84)  a. *a can tomatoes/a can of tomatoes/one can of tomatoes  
      b. a few suggestions/*a few of suggestions/*one few of suggestions  
      c. *a lot suggestions/a lot of suggestions/*one lot of suggestions  

Expressions like few and lot actually behave quite differently. With respect to few, it appears that a few acts like a complex word. However, lot acts more like a noun, but unlike can, it does not allow its specifier to be a numeral.

In terms of agreement, measure noun phrases behave like Type I partitive constructions:

(85)  a. A can of tomatoes is/*are added.  
      b. Two cans of tomatoes are/*is added.
We can see here that it is the head noun *can* or *cans* which determines the NUM value of the whole NP. The inner NP in the PP does not affect the NUM value at all. These observations lead us to posit the following lexical entry for a measure noun:

\[
\begin{array}{l}
  \langle\text{pound}\rangle \\
  \text{HEAD} \langle\text{POS noun}\rangle \\
  \text{NUM sing} \\
  \text{SPR} \langle\text{DP}\rangle \\
  \text{COMPS} \langle\text{PP[PFORM of]}\rangle \\
\end{array}
\]

That is, a measure noun like *pound* requires one obligatory SPR and a PP complement. Unlike partitive constructions, there is no definiteness restriction on the PP complement.

Finally, there is one set of words whose behavior leaves them somewhere between quantity words and measure nouns. These are words such as *dozen, hundred, and thousand*:

\[
\begin{array}{l}
  \text{a. three hundred of your friends} \\
  \text{b. *three hundreds of your friends} \\
  \text{c. *three hundreds of friends} \\
  \text{d. three hundred friends} \\
  \text{e. hundreds of friends/*hundreds friends} \\
\end{array}
\]

Consider the behavior of *hundred* and *hundreds* here. The singular *hundred*, when used as noun, obligatorily requires a PP[*of*] complement as well as a numeral specifier, as in (87a). The plural *hundreds* requires no specifier although it also selects a PP complement. Not surprisingly, similar behavior can be observed with *thousand* and *thousands*:

\[
\begin{array}{l}
  \text{a. several thousand of Bill’s supporters} \\
  \text{b. *several thousands of Bill’s supporters} \\
  \text{c. *several thousands of supporters} \\
  \text{d. several thousand supporters} \\
  \text{e. thousands of supports/*thousands supports} \\
\end{array}
\]

One way to capture these properties is to assign the following lexical specifications to *hundred* and *hundreds*:

\[
\begin{array}{ll}
  \text{a.} & \begin{array}{l}
  \langle\text{hundred}\rangle \\
  \text{HEAD noun} \\
  \text{SPR} \langle 1 \rangle \\
  \text{COMPS} \langle\text{PP[PFORM of]}\rangle \\
\end{array} \\
  \text{b.} & \begin{array}{l}
  \langle\text{hundreds}\rangle \\
  \text{HEAD | POS noun} \\
  \text{SPR} \langle \rangle \\
  \text{COMPS} \langle\text{PP[PFORM of]}\rangle \\
\end{array}
\end{array}
\]

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Even though there may be some semantic reasons for all these different kinds of lexical specifications, for now, stating it all directly in the lexical entries will account at least for the data given here.

### 6.6 Modifying an NP

#### 6.6.1 Prenominal Modifiers

Adjectives are expressions commonly used to modify a noun. However, not all adjectives can modify nouns. Even though most adjectives can be used either as in a modifying (attributive) function or as a predicate (as in *She is tall*), certain adjectives are restricted to their usages. Adjectives such as *alive, asleep, awake, afraid, ashamed, aware, utter*, can be used only predicatively, whereas others such as *wooden, drunken, golden, main, mere* are only used attributively:

(90) a. He is alive.
    b. He is afraid of foxes.

(91) a. It is a wooden desk.
    b. It is a golden hair.
    c. It is the main street.

(92) a. *It is an alive fish. (cf. living fish)*
    b. *They are afraid people. (cf. nervous people)*

(93) a. *This objection is main. (cf. the main objection)*
    b. *This fact is key. (cf. a key fact)*

The predicately-used adjectives are specified with the feature PRD, and with a MOD value being empty as default, as shown here:

(94)

\[
\begin{array}{c}
\text{HEAD} \quad \langle \text{alive} \rangle \\
\text{POS} \quad \text{adj} \\
\text{PRD} \quad + \\
\text{MOD} \quad \langle \rangle \\
\end{array}
\]

This says that *alive* is used predicatively, and does not have a specification for a MOD value (the value is empty). This lexical information will prevent predicative adjectives from also functioning as noun modifiers.\(^{74}\)

In contrast to the predicative adjective, a modifying adjective will have the following lexical entry:

(95)

\[
\begin{array}{c}
\text{HEAD} \quad \langle \text{brave} \rangle \\
\text{POS} \quad \text{adj} \\
\text{MOD} \quad \langle N' \rangle \\
\end{array}
\]

---

\(^{74}\)In addition, all predicative expressions select one argument, their subject (SPR). This information is not shown here.
This specifies an adjective which modifies any value whose POS is *noun*. This will license a structure like the following:

6.6.2 Postnominal Modifiers

Postnominal modifiers are basically the same as prenominal modifiers with respect to what they are modifying. The only difference is that they come after what they modify. Various phrases can function as such postnominal modifiers:

(97) a. [The boy [in the doorway]] waved to his father.
    b. [The man [eager to start the meeting]] is John’s sister.
    c. [The man [holding the bottle]] disappeared.
    d. [The papers [removed from the safe]] have not been found.
    e. [The money [that you gave me]] disappeared last night.

All these postnominal elements bear the feature MOD. Leaving aside detailed discussion of the relative clause(-like) modifiers in b–e until Chapter 12, we can say that example (97)a will have the following structure:
These modifiers must modify either an N or N’, but not a complete NP. This claim is consistent with the examples above and with the (ungrammatical) examples in (99):

(99)  
   a. *John in the doorway waved to his father.  
   b. *He in the doorway waved to his father.

A proper noun or a pronoun projects directly to the NP, with no complement or specifier. If it were the case that post-nominal PP could modify any NP, these examples ought to be acceptable. We take up the further details of these modifying structures in Chapter 11.
6.7 Exercises

1. Draw the structures of the following NPs.
   (i) a. My friend’s sister’s son
   b. the incineration of the three astronauts
   c. an absurdly pointless dexterity with my hands
   d. a new, younger audience all eager to buy merchandise
   e. the denial of the validity of material things

2. Draw tree structures for the following and mark which decides the agreement (AGR) feature of the subject NP.
   (i) a. Neither of these men is worthy to lead Italy.
   b. None of his customary excuses suffices Edgar now.
   c. One of the problems was the robins.
   d. All of the plant virus web sites have been conveniently collected in one central location.
   e. Some of the water from melted snow also goes into the ground for plants.
   f. Most of the milk your baby ingests during breastfeeding is produced during nursing.

3. Compare the following data and assign an appropriate lexical category to both and few. In doing so, try to provide arguments for your answers.
   (i) a. Both of the workers will wear carnations.
   b. Both the workers will wear carnations.
   c. Both workers will wear carnations.
   d. Both will wear carnations.
   (ii) a. Few of the doctors approve of our remedy.
   b. Few doctors approve of our remedy.
   c. Few approve of our remedy.

4. Provide the correct VFORM value of the underlined verb and identify the noun that semantically determines this VFORM value.
   (i) a. An example of these substances be tobacco.
   b. The effectiveness of teaching and learning depend on several factors.
   c. One of the most serious problems that some students have be lack of motivation.
   d. Ten years be a long time to spend in prison.
   e. Everyone of us be given a prize.
   f. Some of the fruit be going bad.
   g. All of his wealth come from real estate investments.
   h. Do some of your relatives live nearby.
   i. In the center of the cemetery lie the grave of the unknown soldier.
   j. Two ounces of this caviar cost nearly three hundred dollars.
k. Fifty pounds seem like a lot of weight to lose in one year.
l. News of Persephone and Demeter reach the great gods and goddesses of Olympus.
m. Half of the year be dark and wintry.
n. Some of the promoters of ostrich meat compare its taste to beef tenderloin.

5. Find any grammatical errors in the following examples and explain why.
   (i) a. The most impressive monument of Egypt’s greatness, and one of the wonders of the world, are the pyramids.
   b. They produced various medicines, the power of which were widely advertised.
   c. The sharing which the two ministers made of their responsibilities were not successful.
   d. The practical results of recognizing this fault was as follows.
   e. The services of the Church of England states this to be a truth.
   f. All special rights of voting in the election was abolished.
   g. One of major factors affecting the value of diamonds are their weight.
   h. Each of these stones have to be cut and polished.
   i. Most of her free time are spent attending concerts and plays or visiting museums and art galleries.

6. As noted, English also has the pronoun-antecedent agreement which asks a pronoun to match with its antecedent in number, person, and gender value. Consider the following sentences and identify the errors in the usage of the pronouns. In doing so, provide the lexical entries for the pronoun and its antecedent to see what values are mismatching.
   (i) a. The dog goes wild. He always messes up my front garden.
   b. No one knows on this bus seems to know their way around this part of Seoul.
   c. If people want to succeed in corporate life, she has to know the rules of the game.
   d. Anyone with a family history of heart disease should have their cholesterol checked.
   e. Each ceramic tile and aluminum alloy sample used in the experiment retained their initial hardness.

7. Consider the distribution of the reflexive pronouns (myself, yourself, himself, herself) and simple pronouns (me, you, he, him, her), respectively. Please provide rules which can explain their distributions.
   (i) a. *I washed me.
   b. You washed me.
   c. He washed me.
   (ii) a. I washed myself.
b. *You washed myself.
c. *He washed myself.

(iii) a. I washed you.
    b. *He washed him. (He and him referring to the same person.)
    c. He kicked you.

(iv) a. *I washed yourself.
    b. You washed yourself.
    c. *He washed yourself.

Once you have your own hypothesis for the above data, now examine the following data, and then determine whether your previous hypothesis can account for this extra data; and if not, revise your hypothesis so that it can extend to these examples:

(v) a. Harry says that Sally dislikes him.
    b. *Harry says that Sally dislikes himself.

(vi) a. Sally wishes that everyone would praise her.
    b. *Sally wishes that everyone would praise herself.

(vii) a. Sally believes that she is brilliant.
    b. *Sally believes that herself is brilliant.
    c. They persuaded me to defend themselves.

8. Read the following passages and draw trees for the bracketed sentences. In doing so, specify the AGR and IND value of the italicized words:

(i) [The power of your mind and the power of your body have a tight connection.] If you have a strong body, your mind feels pumped and healthy, too. [If you have a strong mind, you can craft your body to accomplish amazing things]. I focus on constantly developing this double toughness. I train hard, play hard, and when life snaps at me, I live hard. [This philosophy gets me through anything and everything].
Raising and Control Constructions

7.1 Raising and Control Predicates

As noted in Chapter 5, certain verbs select an infinitival VP as their complement. Compare the following pairs of examples:

(1) a. John tries to fix the computer.
    b. John tends to fix the computer.

(2) a. Mary persuaded John to fix the computer.
    b. Mary expected John to fix the computer.

At first glance, these pairs are structurally isomorphic in terms of complements: both *try* and *tend* select an infinitival VP, and *expect* and *persuade* select an NP and an infinitival VP. However, there are several significant differences which motivate two classes, known as control and raising verbs:

(3) a. Control verbs and adjectives: try, hope, eager, persuade, promise, consider, etc.
    b. Raising verbs and adjectives: seem, appear, happen, likely, certain, believe, expect, etc.

Verbs like *try* are called ‘control’ or ‘equi’ verbs, where subject is understood to be ‘equivalent’ to the unexpressed subject of the infinitival VP. In linguistic terminology, the subject of the verb is said to ‘control’ the subject of the infinitival complement. Let us consider the ‘deep structure’ of (1a) representing unexpressed subject of the VP complement of *tries*:

(4) John tries [(for) John to fix the computer].

As shown here, in this sentence it is John who does the action of fixing the computer. In the original transformational grammar approach, this deep structure would be proposed and then

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75Deep structure, linked to surface structure, is a theoretical construct and abstract level of representation that seeks to unify several related observed form and played an important role in the transformational grammar of the 20th century. For example, the surface structures of both *The cat chased the mouse* and *The mouse was chased by the cat* are derived from the identical deep structure similar to *The cat chased the mouse.*
undergo a rule of ‘Equivalent NP Deletion’ in which the second NP John would be deleted, to produce the output sentence. This is why such verbs have the label of ‘equi-verbs’.

Meanwhile, verbs like seem are called ‘raising’ verbs. Consider the deep structure of (1b):

(5) \[\triangle \text{seems [John to fix the computer].}\]

In order to derive the ‘surface structure’ (1b), the subject John needs to be raised to the matrix subject position marked by \(\triangle\). This is why verbs like seem are called ‘raising’ verbs.

This chapter discusses the similarities and differences of these two types of verb, and shows how we explain their respective properties in a systematic way.

### 7.2 Differences between Raising and Control Verbs

There are many differences between the two classes of verb, which we present here.

#### 7.2.1 Subject Raising and Control

**The semantic role of the subject:** One clear difference between raising and control verbs is the semantic role assigned to the subject. Let us compare the following examples:

(6) a. John tries to be honest.
   b. John seems to be honest.

These might have paraphrases as follows:

(7) a. John makes efforts for himself to be honest.
   b. It seems that John is honest.

As suggested by the paraphrase, the one who does the action of trying is John in (6a). How about (6b)? Is it John who is involved in the situation of ‘seeming’? As represented in its paraphrase (7b), the situation that the verb seem describes is not about the individual John, but is rather about the proposition that John is honest. Due to this difference, we say that a control verb like try assigns a semantic role to its subject (the ‘agent’ role), whereas a raising verb seem does not assign any semantic role to its subject (this is what (5) is intended to represent).

**Expletive subjects:** Since the raising verb does not assign a semantic role to its subject, certain expressions which do not have a semantic role or any meaning may appear in the subject position. Such items include the expletives it or there:

(8) a. It tends to be warm in September.
   b. It seems to bother Kim that they resigned.

The situation is markedly different with control verbs:

(9) a. *It/There tries to be warm in September.
   b. *It/There hopes to bother Kim that they resigned.

Since control verbs like try and hope require their subject to have an agent role, an expletive it or there, which takes no semantic role, cannot function as their subject.

We can observe the same contrast with respect to raising and control adjectives:
(10)  a. It/*John is easy to please John.
    b. John/*It is eager to be easy to please Maja.

Since the raising adjective *easy do not assign any semantic role to its subject, we can have *it as its subject. On the other hand, the control adjective *eager assigns a role and thus does not allow the expletive *it as its subject.

Subcategorization: If we look into what determines the subject’s properties, we can see that in raising constructions, it is not the raising verb or adjective, but the infinitival complement’s predicate which determines the characteristic of the subject. In raising constructions, the subject of the raising predicate is selected as the subject of the complement VP. Observe the following contrast:

(11)  a. Stephen seemed [to be intelligent].
    b. It seems [to be easy to fool Ben].
    c. There is likely [to be a letter in the mailbox].
    d. Tabs are likely [to be kept on participants].
        in the sense of: ‘The participants will be spied on.’

(12)  a. *There seemed [to be intelligent].
    b. *John seems [to be easy to fool Ben].
    c. *John is likely [to be a letter in the mailbox].
    d. *John is likely [to be kept on participants].

For example, the VP *to be intelligent requires an animate subject, and this is why (11a) is fine but (12a) is not. Meanwhile, the VP *to be easy to fool Ben requires the expletive *it as its subject. This is why John cannot be the subject in (12b). The contrast in (c) and (d) is similar. The VP [to be a letter in the mailbox] allows its subject to be there (cf. There is a letter in the mailbox) but not John. The VP [to be kept on participants] requires a subject which must be the word tabs in order to induce an idiomatic meaning.

In raising constructions, whatever category is required as the subject of the infinitival VP, is also required as the subject by the higher VP – hence the intuition of ‘raising’: the requirement for the subject passes up to the higher predicate.

However, for control verbs, there is no direct selectional relation between the subject of the main verb and that of the infinitival VP. It is the control verb or adjective itself which fully determines the properties of the subject:

(13)  a. Sandy tried [to eat oysters].
    b. *There tried [to be riots in Seoul].
    c. *It tried [to bother me that Chris lied].
    d. *Tabs try [to be kept on Bob by the FBI].
    e. *That he is clever is eager [to be obvious].
Regardless of what the infinitival VP would require as its subject, a control predicate requires its subject to be able to bear the semantic role of agent. For example, in (13b) and (13c), the subject of the infinitival VP can be *there* and *it*, but these cannot function as the matrix subject – because the matrix verb *tried* requires its own subject, a ‘trier’.

**Selectional Restrictions:** Closely related to the difference in selection for the type of subject, we can observe a related similarity with regard to what are known as ‘selectional restrictions’. The subcategorization frames, which we have represented in terms of VAL (valence) features, are themselves syntactic, but verbs also impose semantic selectional restrictions on their subjects or objects. For example, the verb *thank* requires a human subject and an object that is at least animate:

(14)  
   a. The king thanked the man.  
   b. #The king thanked the throne.  
   c(?)The king thanked the deer.  
   d. #The castle thanked the deer.

And consider as well the following examples:

(15)  
   a. The color red is his favorite color.  
   b. #The color red understands the important issues of the day.

Unlike the verb *is*, *understands* requires its subject to be sentient. This selectional restriction then also explains the following contrast:

(16)  
   a. The color red seems [to be his favorite color].  
   b. #The color red tried [to be his favorite color].

The occurrence of the raising verb *seems* does not change the selectional restriction on the subject. However, *tried* is different: just like *understand*, the control verb *tried* requires its subject to be sentient, at least. What we can observe here is that the subject of a raising verb carries the selectional restrictions of the infinitival VP’s subject. This in turn means that the subject of the infinitival VP is the subject of the raising verb.

**Meaning preservation:** We have seen that the subject of a raising predicate is that of the infinitival VP complement, and it has no semantic role at all coming from the raising predicate. This implies that an idiom whose meaning is specially composed from its parts will still retain its meaning even if part of it appears as the subject of a raising verb.

(17)  
   a. The cat seems to be out of the bag.  
   b. *The cat tries to be out of the bag.

In the raising example (17a), the meaning of the idiom *The cat is out of the bag* is retained. However, since the control verb *tries* assigns a semantic role to its subject *the cat*, ‘the cat’ must be the one doing the action of trying, and there is no idiomatic meaning.
This preservation of meaning also holds for examples like the following:

(18)  
  a. The dentist is likely to examine Pat.  
  b. Pat is likely to be examined by the dentist.

(19)  
  a. The dentist is eager to examine Pat.  
  b. Pat is eager to be examined by the dentist.

Since the raising predicate *likely* does not assign a semantic role to its subject, (18a) and (18b) have more or less identical meanings – the proposition is about the dentist examining Pat, in active or passive grammatical forms: the active subject is raised in (18)a, and the passive subject in (18)b.

However, the control predicate *eager* assigns a semantic role to its subject, and this forces (19a) and (19b) to differ semantically: in (19a), it is the dentist who is eager to examine Pat, whereas in (19b), it is Pat who is eager to be examined by the dentist. Intuitively, if one of the examples in (18) is true, so is the other, but this inference cannot be made in (19).

### 7.2.2 Object Raising and Control

Similar contrasts are found between what are know as object raising and control predicates:

(20)  
  a. Stephen believed Ben to be careful.  
  b. Stephen persuaded Ben to be careful.

Once again, these two verbs look alike in terms of syntax: they both combine with an NP and an infinitival VP complement. However, the two are different with respect to the properties of the object NP in relation to the rest of the structure. Observe the differences between *believe* and *persuade* in (21):

(21)  
  a. Stephen believed it to be easy to please Maja.  
  b. *Stephen persuaded it to be easy to please Maja.

(22)  
  a. Stephen believed there to be a fountain in the park.  
  b. *Stephen persuaded there to be a fountain in the park.

One thing we can see here is that unlike *believe*, *persuade* does not license an expletive object (just like *try* does not license an expletive subject). And in this respect, the verb *believe* is similar to *seem* in that it does not assign a semantic role (to its object). The differences show up again in the preservation of idiomatic meaning:

(23)  
  a. Stephen believed the cat to be out of the bag.  
  b. *Stephen persuaded the cat to be out of the bag.

  in the sense: ‘Stephen believed that the secret was out’.

While the idiomatic reading is retained with the raising verb *believed*, it is lost with the control verb *persuaded*.

Active-passive pairs show another contrast:

(24)  
  a. The dentist was believed to have examined Pat.
b. Pat was believed to have been examined by the dentist.

(25) a. The dentist was persuaded to examine Pat.
   b. Pat was persuaded to be examined by the dentist.

With the raising verb *believe*, there is no strong semantic difference in the examples in (24). However, in (25), there is a clear difference in who is persuaded. In (25a), it is the dentist, but in (25b), it is Pat who is persuaded. This is one more piece of evidence that *believe* is a raising verb whereas *persuade* is a control verb, with respect to the object.

### 7.3 A Simple Transformational Approach

How then can we account for these differences between raising and control verbs or adjectives? A simple traditional analysis, hinted at earlier, is to derive a surface structure via a derivational process, for example, from (26a) to (26b):

(26) a. Deep structure: △ seems [Stephen to be irritating]
   
   b. Surface structure: Stephen seems [t] to be irritating.

To derive (26b), the subject of the infinitival VP in (26a) moves to the matrix subject position, as represented in the following tree structure:

(27)

The movement of the subject *Stephen* to the higher subject position will correctly generate (26b). This kind of movement to the subject position can be triggered by the requirement that each English declarative have a surface subject (cf. Chomsky 1981). A similar movement process can be applied to the object raising cases:

(28) a. Deep structure: Tom believes [Stephen to be irritating].
   
   b. Surface structure: Tom believes Stephen to be irritating.

Here the embedded subject *Stephen* moves not to the matrix subject but to the matrix object position:
Control constructions are different: there is no movement operation involved. Instead, it is the lower subject position which has special properties. Consider the examples in (30):

(30)  
\[\text{a. John tried to please Stephen.}\]
\[\text{b. John persuaded Stephen to be more careful.}\]

Since *try* and *persuade* assign a semantic roles to their subject, and objects, an unfilled position of the kind designated above by △ cannot be allowed. Instead, it is posited that there is an unexpressed subject of the infinitival VP *to please Stephen* and *to be more careful*. This is traditionally represented as the element called ‘PRO’ (a silent ‘pro’noun),, and the examples will have the following deep structures:

(31)  
\[\text{a. John tried [PRO to please Stephen].}\]
\[\text{b. John persuaded Stephen [PRO to be more careful].}\]

The final tree representations of these are as follows:
An independent part of the theory of control links PRO in each case to its antecedent, marked by coindexing. In (32a), PRO is coindexed with John whereas in (32b), it is coindexed with Stephen.

These analyses which involve derivations on tree structures are driven by the assumption that the mapping between semantics and syntax is very direct. For example, in (29), the verb believe semantically selects an experiencer and a proposition, and this is reflected in the initial structure. In some syntactic respects, though, believe acts like it has an NP object (separate from the infinitival complement), and the raising operation creates this object. In contrast, persuade semantically selects an agent, a patient, and a proposition, and hence the structure in (32)b reflects this: the object position is there all along, so to speak.

The classical transformational approach provides a useful graphical approach to understanding the difference between raising and control. However, it requires assumptions about the nature of grammar rather different from what we have made throughout this book. In the rest of this chapter, we present a non-transformational account of control and raising.

7.4 A Nontransformational Approach

7.4.1 Identical Syntactic Structures

Instead of the movement approach in which movement operations and various kinds of empty elements or positions play crucial roles, we simply focus here directly on the surface structures of raising and control constructions. Going back to seem and try, we can observe that both select an infinitival VP, as in (33), giving the structures in (34):

(33) a. \[
\begin{array}{c}
\langle \text{seems} \rangle \\
\text{SPR} & \langle \text{NP} \rangle \\
\text{COMPS} & \langle \text{VP[}\text{VFORM inf}\rangle \rangle \\
\end{array}
\]
As shown here, *seems* and *tries* actually have identical structures.

The object raising verb *expect* and the control verb *persuade* also have identical valence (SPR and COMPS) information:

(35) a. \[
\begin{array}{c}
\langle \text{expects} \rangle \\
\text{SPR} \quad \langle \text{NP} \rangle \\
\text{COMPS} \quad \langle \text{NP}, \text{VP}[\text{VFORM \text{inf}}] \rangle
\end{array}
\]

b. \[
\begin{array}{c}
\langle \text{persuaded} \rangle \\
\text{SPR} \quad \langle \text{NP} \rangle \\
\text{COMPS} \quad \langle \text{NP}, \text{VP}[\text{VFORM \text{inf}}] \rangle
\end{array}
\]

These two lexical entries will license the following structures:
As can be seen here, raising and control verbs are not different in terms of their subcategorization or valence requirements, and so they project similar structures. The question is then how we can capture the different properties of raising and control verbs. The answer is that their differences follow from the other parts of the lexical information, in particular, the mapping relations from syntax to semantics.

### 7.4.2 Differences in Subcategorization Information

We have observed that for raising predicates, whatever kind of category is required as subject by the infinitival VP is also required as the subject of the predicate. Some of the key examples are repeated here:

- (37) a. Stephen/*It/*There seemed to be intelligent.
  b. It seemed to rain.
  c. There seemed to be a fountain in the park.

- (38) a. Stephen/*It/*There tried to be intelligent.
  b. *It tried to rain.
  c. *There tried to be a fountain in the park.

While the subject of a raising predicate is identical to that of the infinitival VP complement., the subject of a control predicate has a different requirement. The subject of a control predicate is coindexed with that of the infinitival VP complement. This difference can be represented in the lexical information shown in (39). The raising verb involves shared subjects, while the control verb only shares the index (of the subjects).
These two lexical entries represent the difference between *seem* and *try*: for *seemed*, the subject of the VP complement is identical with its own subject (notated by [1]) whereas for *tried*, only the index value of its VP complement is identical to that of its subject. That is, the VP complement’s understood subject refers to the same individual as the subject of *tried*. This index identity in control constructions is clear when we consider examples like the following:

(40) Someone, tried NPᵢ to leave the town.

The example here means that whoever *someone* might refer to, that same person left town.

Object raising and control predicates are no different. Raising verbs select a VP complement whose subject is fully identical with the object. Control verbs select a VP complement whose subject’s index value is identical with that of its subject. The following lexical entries show these properties:

(41) a. 
\[
\begin{align*}
\langle \text{expect}\rangle \\
\text{SPR} \quad \langle \text{NPᵢ} \rangle \\
\text{COMPS} \quad \langle \text{VP} \left[ \text{VFORM inf} \right. \text{SPR} \langle [1] \rangle \rangle \rangle \\
\end{align*}
\]

b. 
\[
\begin{align*}
\langle \text{persuade}\rangle \\
\text{SPR} \quad \langle \text{NP} \rangle \\
\text{COMPS} \quad \langle \text{NPᵢ}, \text{VP} \left[ \text{VFORM inf} \right. \text{SPR} \langle \text{NPᵢ} \rangle \rangle \rangle \\
\end{align*}
\]

Let us look at the structures these lexical entries eventually project:
As represented here, the subject of to rain tomorrow is the NP object of expects, while the subject of to be more careful is coindexed with the independent object of persuade.
7.4.3 Mismatch between Meaning and Structure

We have not yet addressed the issue of differences in the assignment of semantic roles. We first need to introduce further semantic features, distinguished from syntactic features, for this issue is closely related to the relationship between syntax and semantics. As we have seen before, nouns and verbs have IND values [[REF]]. That is, a noun refers to an individual whereas a verb denotes a situation. In addition, a predicate represents a semantic property or relation. For example, the meaning of the verb *hits* in (44a) can be represented in canonical first-order predicate logic as in (44b):

(44) a. John hits a ball.
    b. hit’(j, b)

This shows that the verb *hit* takes two arguments with the predicate relation *hit*, with the ’ notation to indicate the semantic value. The relevant semantic properties can be represented in a feature structure system as follows:

(45)

In terms of syntax, *hit* is a verb selecting a subject and a complement, as shown in the value of the feature SYN(TAX). The semantic information of the verb is represented with the feature SEM(ANTICS). It first has the attribute IND(EX), representing what this expression refers to; as a verb, *hit* refers to a situation *s0* in which an individual *i* hits and individual *j*. The semantic relation of hitting is represented using the feature for semantic relations (RELS). The feature RELS has as its value a list of one feature structure, here with three further features, PRED(ICATE), AGENT, and PATIENT. The predicate (PRED) relation is whatever the verb denotes: in this case, *hit* takes two arguments.

The AGENT argument in the SEM value is coindexed with the SPR in the SYN value, while the the PATIENT is coindexed with COMPS. This coindexing links the subcategorization information of *hit* with the arguments in its semantic relation. Simply put, the lexical entry in (45) is the formal representation of the fact that in *X hits Y*, *X* is the hitter and *Y* is the one hit.

Now we can use these extra parts of the representation for the semantic differences in raising and control verbs. The subject of a raising verb like *seem* is not assigned any semantic role, while that of a control verb like *try* is definitely linked to a semantic role. Assuming that ‘*s0*’...
or ‘s1’ stand for situations denoted by an infinitival VP, *seem* and *try* will have the following simplified meaning representations:

(46) a. *seem*'(s0) (“s0 seems (to be the case”)
    b. *try*(i, s1) (“i tries to (make) s1 (be the case)”)

These meaning differences are represented in terms of feature structures as follows:

\[
\begin{align*}
(47) \quad &a. \langle \text{seem} \rangle \\
&\text{SYN} | \text{VAL} \\
&\quad \text{COMPS} \langle \text{VP} \\
&\quad \quad \text{SPR} \langle \text{IND} s0 \\
&\quad \quad \text{VFORM} \langle \text{inf} \rangle \\
&\quad \text{IND} s1 \\
&\text{SEM} \\
&\quad \text{RELS} \langle \text{PRED seem} \rangle \\
&\quad \text{SIT s1} \\

\quad &b. \langle \text{try} \rangle \\
&\text{SYN} | \text{VAL} \\
&\quad \text{COMPS} \langle \text{VP} \\
&\quad \quad \text{SPR} \langle \text{IND} s0 \\
&\quad \quad \text{VFORM} \langle \text{inf} \rangle \\
&\quad \text{IND} s1 \\
&\text{SEM} \\
&\quad \text{RELS} \langle \text{PRED try} \rangle \\
&\quad \text{AGENT i} \\
&\quad \text{SIT s1}
\end{align*}
\]

We can see here that even though the verb *seem* selects two syntactic arguments, its meaning relation has only one argument: note that the subject (SPR) is not coindexed with any argument in the semantic relation. This means that the subject does not receive a semantic role (from *seem*). Meanwhile, *try* is different. Its SPR is coindexed with the AGENT role in the semantics, and the SPR is also coindexed with the VP complement’s SPR.

Now we look at object-related verbs like *expect* and *persuade*. Just like the contrast between *seem* and *try*, the key difference lies in whether the object (y) receives a semantic role or not:

(48) a. *expect*'(x, s0)
b. persuade′(x, y, s1)

What one believes, as an ‘experiencer’, is a proposition denoted by the VP complement, whereas what a person x persuades is not a proposition but rather, one persuades an individual y denoted by the object to perform the proposition denoted by the VP. Once again, these differences are more clearly represented in feature structures:

\[(49)\]

\[
\begin{align*}
&\text{a. } \langle \text{expect} \rangle \\
&\quad \text{SYN } \text{VA} \left[ \begin{array}{l}
\text{SPR } \langle \text{NP}_i \rangle \\
\text{COMPS } \langle \text{NP} \rangle, \text{ VP } \\
\text{VFORM } \text{inf} \\
\text{SPR } \langle \text{NP} \rangle \\
\text{IND } \text{sl}
\end{array} \right] \\
&\quad \text{SEM } \text{RELS } \langle \begin{array}{l}
\text{PRED } \text{expect} \\
\text{EXPERIENCER } i \\
\text{SIT } \text{sl}
\end{array} \rangle
\end{align*}
\]

\[
\begin{align*}
&\text{b. } \langle \text{persuade} \rangle \\
&\quad \text{SYN } \text{VA} \left[ \begin{array}{l}
\text{SPR } \langle \text{NP}_i \rangle \\
\text{COMPS } \langle \text{NP} \rangle, \text{ VP } \\
\text{VFORM } \text{inf} \\
\text{SPR } \langle \text{NP} \rangle \\
\text{IND } \text{sl}
\end{array} \right] \\
&\quad \text{SEM } \text{RELS } \langle \begin{array}{l}
\text{PRED } \text{persuade} \\
\text{AGENT } i \\
\text{THEME } j \\
\text{SIT } \text{sl}
\end{array} \rangle
\end{align*}
\]

As seen in the lexical entries, believe has two semantic arguments, EXPERIENCER and SIT: the object is not linked to a semantic argument of believe. In contrast, persuade has three semantic arguments: AGENT, THEME, and SIT. We can thus conclude that raising predicates assign one less semantic role in their argument structures than the number of syntactic dependents, while with control predicates, there is a one-to-one correlation.
7.5 Explaining the Differences

7.5.1 Expletive Subject and Object

Recall that for raising verbs like *seem* and *believe*, the subject and object respectively is dependent for its semantic properties solely upon the type of VP complement. This fact is borne out by the examples in (50):

(50) a. There/*It/*John seems [to be a fountain in the park].
    b. We believed there/*it/*John [to be a fountain in the park].

Control verbs are different, directly assigning a semantic role to the subject or object. Hence expletives cannot appear (illustrated here for the subject of *try*):

(51) a. *There/*It/John tries to leave the country.
    b. We believed *there/*it/John to try to leave the country.

7.5.2 Meaning Preservation

We noted above that in a raising example such as (52a), the idiomatic reading can be preserved, but not in a control example like (52b):

(52) a. The cat seems to be out of the bag.
    b. The cat tries to be out of the bag.

This is once again because the subject of *seems* does not have any semantic role: its subject is identical with the subject of its VP complement *to be out of the bag*, whereas the subject of *tries* has its own agent role.

Exactly the same explanation applies to the following contrast:

(53) a. The dentist is likely to examine Pat.
    b. Pat is likely to be examined by the dentist.

Since *likely* is a raising predicate, as long as the expressions *The dentist examines Pat* and *Pat is examined by the dentist* have roughly the same meaning, the two raising examples will also have roughly the same meaning.

However, control examples are different:

(54) a. The dentist is eager to examine Pat.
    b. Pat is eager to be examined by the dentist.

The control adjective *eager* assigns a semantic role to its subject independent of the VP complement, as given in the following lexical entry:
This then means that (54a) and (54b) must differ in that in the former, it is the dentist who is eager to perform the action denoted by the VP complement, whereas in the latter, it is Pat who is eager.

7.5.3 Subject vs. Object Control Verbs

Consider finally the following two examples:

(56) a. They persuaded me to leave.
    b. They promised me to leave.

Both persuaded and promised are control verbs since their object is assigned a semantic role (and so is their subject). This in turn means that their object cannot be an expletive:

(57) a. *They persuaded it to rain.
    b. *They promised it to rain.

However, the two are different with respect to the controller of the infinitival VP. Consider who is understood as the unexpressed subject of the infinitival verb here. In (56a), it is the object me which semantically functions as the subject of the infinitival VP. Yet, in (56b), it is the subject they who will do the action of leaving. Due to this fact, verbs like promise are known as ‘subject control’ verbs, whereas those like persuade are ‘object control’ verbs. This difference is straightforwardly represented in their lexical entries:

(58) \[
\begin{pmatrix}
\langle\text{persuade}\rangle \\
\text{SPR} \langle\text{NP}_i\rangle \\
\text{COMPS} \langle\text{NP}_j, \text{VP} \left[\text{VFORM inf} \right] \rangle \\
\text{SPR} \langle\text{NP}_j\rangle \\
\end{pmatrix}
\]
Based on world knowledge, we know that when one promises someone to do something, this means that the person who makes the promise will do the action. Meanwhile, when one persuades someone to do something, the person who is persuaded will do the action. The lexical entries here reflect this knowledge of the relations in the world.

In sum, the properties of raising and control verbs presented here can be summarized as follows:

- Unlike control predicates, raising predicates are unusual in that they do not assign a semantic role to their subject or object. The absence of a semantic role accounts for the possibility of expletives *it* or *there* or parts of idioms as subject or object with raising predicates, and not with control predicates.

- With control predicates, the VP complement’s unexpressed subject is coindexed with one of the syntactic dependents. With raising predicates, the entire syntactic-semantic value of the subject of the infinitival VP is structure-shared with that of one of the dependents of the predicate. This ensures that whatever category is required by the raising predicate’s VP complement is the raising predicate’s subject (or object). Notice that even non-NPs can be subject in certain kinds of example (see (59)).

(59)  

a. Under the bed is a fun place to hide.  
b. Under the bed seems to be a fun place to hide.  
c. *Under the bed wants to be a fun place to hide. (*want is a control verb)
7.6 Exercises

1. Draw trees for the following sentences and provide the lexical entries for the italicized verb.
   
   (i) a. Kim may have *admitted* to let Mary mow the lawn.
   b. Gregory *appears* to have wanted to be loyal to the company.
   c. Jones would *prefer* for it to be *clear* to Barry that the city plans to sue him.
   d. John *continues* to avoid the conflict.
   e. The captain *ordered* the troops to proceed.
   f. He *coaxed* his brother to give him the candy.
   g. Frank *hopes* to persuade Harry to make the cook wash the dishes.

2. Explain why the following sentences are ungrammatical, based on the lexical entries of the predicates in the following sentences.
   
   (i) a. *John seems to rain.
   b. *John is likely to appear that he will win the game.
   c. *Beth tried for Bill to ask a question.
   d. *He believed there to be likely that he won the game.
   e. *It is likely to seem to be arrogant.
   f. *Sandy appears that Kim is happy.
   g. *Dana would be unlikely for Pat to be called upon.
   h. *Robin is nothing in the box.
   i. *It said that Kim was happy.
   j. *There preferred for Sandy to get the job.

3. Decide whether the following lexical elements are raising or control verbs. In particular, use *it*, *there*, and an idiom expression to decide whether an expression is a raising or control predicate:
   
   (i) certain, anxious, lucky, sure, apt, liable, bound, careful, reluctant
   (ii) tend, decide, manage, fail, happen, begin, hope, intend, refuse

4. Discuss the similarities and differences among the following three sentences. In so doing, please use *it*, *there*, and an idiomatic expression. Also see what is the controller of the infinitival VP in each case.
   
   (i) a. Pat expected Leslie to be aggressive.
   b. Pat persuaded Leslie to be aggressive.
   c. Pat promised Leslie to be aggressive.

5. Consider the following data and discuss what can be the antecedent of *her* and *herself*.
   
   (i) a. Kevin *urged* Anne to be loyal to her.
   b. Kevin *urged* Anne to be loyal to herself.

Also observe the following data and discuss the binding conditions of *ourselves* and *us* here. In particular, see if the value of the ARG-ST can tell us anything about this relation.
(ii) a. We expect the dentist to examine us.
   b. *We expect the dentist to examine ourselves.
   c. We expect them to examine themselves.
   d. *We expect them to examine them.

(iii) a. We persuaded the dentist to examine us.
     b. *We persuaded the dentist to examine ourselves.
     c. We persuaded them to examine themselves.
     d. *We persuaded them to examine them.

6. Read the following passage and provide tree structures for the bracketed sentences and lexical entries for the italicized words.

(i) I vividly recall a story I read in a sales book about a salesperson who were so persistent that the customer finally, physically threw him out of the house. As the salesperson lays there on the ground, hurting all over from the wounds he’s gotten after being thrown out, with great difficulty he asks the angry person he’s tried to sell to: “Will you now buy my product?” The customer is so surprised by the salesperson’s persistence that he exhausted and out of pure compassion finally says, “Okay then! But only on the condition that [you promise never to bother me again].”

[Some people still seem to have the same idea]. A tough job! If [you’ve ever tried to persuade other people to buy your product or service], you also know that this can be one of the most discouraging and difficult things to try to do as a business owner. In fact, this way of trying to get business by trying to persuade other people, is one of the factors that causes most business owners to dislike, yes even hate, the process of marketing and selling. [It’s very tough to try to convince other people to buy from you] - especially if it’s against their will. After all, if [you try to persuade someone to buy from you], you try to cause that person to do something. And usually there’s always some kind of pressure involved in this process.
Auxiliary Constructions

8.1 Basic Issues

The English auxiliary system involves a relatively small number of elements interacting with each other in complicated and intriguing ways. This has been one of the main reasons for making the system the most extensively analyzed empirical domains in the literature on generative syntax.

Ontological Issues: One of the main issues in the study of English auxiliary system concerns ontological issues: is it necessary to posit ‘auxiliary’ as an independent part of speech or not? Auxiliary verbs can be generally classified as follows:

- modal auxiliary verbs such as will, shall, may, etc.: have only finite forms and combine with a base VP
- have/be: have both finite & nonfinite forms
- do: has a finite form only with vacuous semantic meaning
- to: has a nonfinite form only with vacuous semantic meaning

Such auxiliary verbs behave differently from main verbs in various respects. There are arguments to treat ‘these so-called auxiliary verbs’ to be categorized as V, though they are crucially different in terms of the semantic contribution. For example, both auxiliary and main verbs bear tense information and can undergo the same syntactic operations such as gapping, as shown in (1):

(1)  a. John drank water and Bill _ wine.
    b. John may drink water, but Bill _ drink beer.

Such phenomena provide apparent stumbling blocks to assign a different lexical category to the English auxiliary verbs from the main verbs.

Distinction between auxiliary and main verbs: Another important issue that raises in the study of the English auxiliary system is the question of which words function as auxiliary verbs
and how we can differentiate the two. Most reliable criteria for auxiliaryhood seems to lie in syntactic phenomena such as negation, inversion, contraction, and ellipsis (henceforth, NICE):

1. Negation: Only auxiliary verbs can be followed by not as a sentential negation (have and be too).

(2) a. Tom will not leave.
   b. *Tom kicked not a ball.
2. Inversion: Only auxiliary verbs can undergo the subject-auxiliary inversion.

(3) a. Will Tom leave the party now?
   b. *Left Tom the party already?
3. Contraction: Only auxiliary verbs can have contracted forms with the suffix n’t.

(4) a. John couldn’t leave the party.
   b. *John leftn’t the party early.
4. Ellipsis: The complement of an auxiliary verb, but not of a main verb can be elided.

(5) a. If anybody is spoiling the children, John is __.
   b. *If anybody keeps spoiling the children, John keeps __.

In addition to these NICE properties, tag questions can be another criterion: an auxiliary verb can appear in the tag of tag questions, but not a main verb:

(6) a. You should leave, shouldn’t you?
   b. *You didn’t leave, left you?

The position of adverbs or floating quantifiers can also be adopted in differentiating auxiliary verbs from main verbs. The difference can be easily observed from the following contrast:

(7) a. She would never believe that story.
   b. *She believed never his story.
(8) a. The boys will all be there.
   b. *Our team played all well.

Adverbs such as never and floating quantifiers such as all can follow an auxiliary verb, but not a main verb.

**Ordering Restrictions:** The third main issue centers on how to capture the ordering restrictions among auxiliary elements. Auxiliary verbs are subject to restrictions that limit the sequences in which they can occur and the forms with which they can combine. Observe the following contrast:

(9) a. The children will have been being seen.
   b. He must have been being interrogated by the police at that very moment.
(10)  a. *The house is been remodelling.
     b. *Margret has had already left.
     c. *He has will seeing his children.
     d. *He has been must being interrogated by the police at that very moment.

As can be observed here, when we have more than two auxiliary verbs, they must come in a certain order. In addition, each auxiliary verb requires that the immediately following one be in a particular morphological form.

In the study of the English auxiliary system, we thus need to address the following issues at least:

- Should we posit an auxiliary category?
- How can we distinguish main verbs from auxiliary verbs?
- How can we account for phenomena (such as NICE) that are sensitive to the presence of an auxiliary verb?
- How can we capture the ordering and co-occurrence restrictions among auxiliary verbs?

This chapter provides answers to these questions.

8.2 Transformational Analyses

The seminal work on these three issues is that of Chomsky (1957). His analysis, introducing the rule in (11), directly stipulates the ordering relations among auxiliary verbs:

(11) $\text{Aux} \rightarrow \text{Tense (Modal) (have + en) (be + ing)}$

The PS rule in (11) would generate sentences with or without auxiliary verbs as in (12):

(12) a. Mary solved the problem.
     b. Mary would solve the problem.
     c. Mary was solving the problem.

For example, see the following structure generating sentences like (12a):

(13) $S$
     $\rightarrow$ $NP$  $AUX$  $VP$
     $\rightarrow$ Mary  $T(M)$  (have + en)  (be + ing)  $Adv$  $VP$
     $\rightarrow$ Past will  $V$  $NP$
     $\rightarrow$ solve  $the$  $problem$
In surface structure, the so-called Affix Hopping rule ensures that the affix tense (Past) in T is hopped to M (Modal) \((\text{will})\) or to the main verb \((\text{solve})\) when Modal does not appear. When there is the modal \(\text{will}\), we would get \(\text{Mary would solve the problem}\). When there isn’t any modal, the affix Past will hop onto the main verb \(\text{solve}\), generating \(\text{Mary solved the problem}\).

In addition to the Affix Hopping Rule, traditional grammar introduces the so called English particular rule ‘do-support’ for negation:

\[
\begin{align*}
(14) & \quad \text{a. *Mary not avoided Bill.} \\
& \quad \text{b. Mary did not avoid Bill.}
\end{align*}
\]

The presence of \(\text{not}\) claimed to prevent Tense from joining with the verb. As an option, the grammar introduces the auxiliary verb \(\text{do}\) on which the affix Tense is hopped. This would then generate (14b).

The analysis, positing this kind of structure with the ad hoc rules, misses several important points. For example, the constituent structure in (13) misses the constituent properties we find in coordination.

\[
\begin{align*}
(15) & \quad \text{a. Fred [must have been singing songs] and [probably was drinking beer.]} \\
& \quad \text{b. Fred must both [have been singing songs] and [have been drinking beer.]} \\
& \quad \text{c. Fred must have both [been singing songs] and [been drinking beer.]} \\
& \quad \text{d. Fred must have been both [singing songs] and [drinking beer.]} \\
\end{align*}
\]

As we have seen earlier, identical phrasal constituents can be conjoined. The coordination examples here indicate that the VP with one auxiliary verb or more behaves just like the one without any.

The data also indicates that in terms of bearing tense information, the auxiliary verb behaves just like the main verb. They both can have tense information and then function as the head of a given sentence. This implies that both the main verb and auxiliary verb can be treated identically as category, but differently in terms of auxiliary properties. That is, we can take both main and auxiliary to be a verbal expression with the feature [POS verb] but different with respect to the AUX feature.

### 8.3 A Lexicalist Analysis

Unlike the traditional view we have seen, we can capture the ordering restrictions based on the lexical properties of the auxiliary verbs. This requires no movement operations such as the Affix Hopping or Do-support.

#### 8.3.1 Modals

One main property of modal auxiliaries such as \(\text{will, shall}\) and \(\text{must}\) is that they have no semantic restrictions on the types of the subject, indicating their status as raising verbs:

\[
\begin{align*}
(16) & \quad \text{a. There might be a unicorn in the garden.} \\
& \quad \text{b. It will rain tomorrow.} \\
& \quad \text{c. John will leave the party earlier.}
\end{align*}
\]
(17)  a. *There hopes to finish the project.
     b. *The bus hopes to be here at five.

As seen from the contrast, the type of subject in (16) depends on what kind of subject is required by the verb right after the modal. This is different from the sentences with the control verb hope in (17).

In addition, modal verbs can only occur in finite forms. They cannot occur neither as infinitives nor as participles.

(18)  a. *to would/*to can/*canning
     b. *John wants to can study syntax.

They further have no 3rd person inflection form:

(19)  a. * John musts leave the party early.
     b. * John wills leave the party early.

As the subcategorization information, modal verbs select a base VP as its complement:

(20)  a. John can [kick/*kicked/*kicking/*to kick the ball].
     b. John will [kick/*kicked/*kicking/*to kick the ball].

Reflecting these basic lexical properties, the modal auxiliary will have at least the following lexical information:

(21)  \[
\begin{array}{c}
\langle\text{must}\rangle \\
\text{HEAD} \quad \text{POS verb} \\
\quad \text{VFORM fin} \\
\quad \text{AUX +} \\
\quad \text{SPR (\text{NP})} \\
\text{VAL} \quad \text{COMPS} \langle \text{VP} \quad \text{VFORM bse} \quad \text{SPR (\text{NP})} \rangle
\end{array}
\]

In the lexical information given here, we need to notice at least three things: first, the auxiliary verbs have the head feature AUX, different from the main verb. This feature thus will thus distinguish auxiliary verbs from main verbs. In addition, it tells us that the modal verb selects a base VP as its complement. This subcategorization information will rule out examples like the following:

(22)  a. *Kim must \text{VP[\text{fin}]}[bakes a cake].
     b. *Kim must \text{VP[\text{fin}]}[baked a cake].
     c. *Kim must \text{VP[\text{fin}]}[will bake a cake].

The possible and impossible structures can be more clearly represented in the tree format:
But the auxiliaries *have and be can be followed by a modal since both can be in nonfinite forms:

(24) a. John can \( V_{P[bae]} \) [have danced].
    b. John can \( V_{P[bae]} \) [be dancing].

The lexical entry in (22) also specifies that the VP’s subject is identical with the subject of a modal auxiliary (indicated by the box \( \square \)). This specification, a crucial property of raising verbs, will rule out examples like the following:

(25) a. *John/It will [rain tomorrow].
    b. *It/There may [exist a man in the park].

The VP *rain tomorrow requires the expletive subject it, not John whereas the VP *exist a main the park requires not it but there as its subject.

In addition, since modal verbs are carrying the feature [VFORM fin], they cannot occur in the environment where finite verbs are prohibited.

(26) a. *We expect there to will rain.
    b. *John would can sing the song.

The simple lexical information of modal verbs given in (21), which is required in almost any analysis, can simply explain the distributional possibilities of modal verbs.

### 8.3.2 Be and Have

The auxiliary verbs *have and be are different from modal verbs. For example, unlike modals, they have nonfinite forms (*would have, would be, to have/to be); they have the 3rd person inflection form (*has, is); they select not a base VP but a different phrase as we will see in due course. In addition, they are different from modals in that they are main verbs.

(27) a. He is a fool.
    b. He has a car.

On the assumption that every sentence has a main verb, *be and have here are main verbs. However, this doesn’t mean that *is here lacks auxiliary properties: it exhibits all of the the NICE properties as can be seen in what follows. This could be another reason why the verb should be categorized as ‘V’ with a feature like AUX. The differences from modal verbs lie in other areas such as semantics and verb inflectional possibilities.

Let us consider *be first. The auxiliary verb *be has three main usages: a copula selecting an predicate XP, an aspectual auxiliary with a progressive VP following, and an auxiliary introduc-
ing a passive verb:

(28)  
   a. John is in the school.
   b. John is running into the car.
   c. John is found in the ground.

There is no categorical or syntactic reason to distinguish these three: they all have NICE properties. They all show identical behavior with subject-auxiliary inversion position of adverbs including floating quantifiers, and so forth.

(29) Subject-Aux Inversion:
   a. Was the child found?
   b. Was the child in the school?
   c. Was the child running into the car?

(30) Position of an adverb:
   a. The child (*completely) was (completely) deceived.
   b. The child (*completely) was (completely) crazy.
   c. The child (*completely) was (completely) running into the car.

Thus, all three will have the lexical information given in (31) as their common denominator:

(31)

All the three bes thus bear the feature AUX and select a predicative phrase whose subject is identical with its own subject. This in turn means that like modals, it is also a raising verb. The main difference just lies in the XP’s VFORM value:

(32)  
   a. copula be: [COMPS ⟨XP⟩]
   b. passive be: [COMPS ⟨VP[VFORM pass]⟩]
   c. progressive be: [COMPS ⟨VP[VFORM prog]⟩]

As given here, the copula be needs no further specification: any phrase that can function as a predicate can be its COMPS. The passive be requires its complement to be a VP[pass], and the progressive be asks its complement to be a VP[prog]. Given these common property as well as differences, we then can easily account for the following:

(33)  
   a. John is [AP happy about the outcome].
   b. The children are [VP[pass] seen in the yard].
   c. John was [VP[prog] seeing his children].
The grammar will not allow examples like the following:

(34) a. John was knowing the answer.
    b. *This is belonging to John.
    c. *John is having sung a song.

The complement of *be needs to be at least one of the three: XP[PRD +], VP[pass], or VP[prog]. However, *knowing, *belonging, and *having here cannot be progressive, they cannot occur here.76

Like the auxiliary *belonging, and *having here cannot be progressive, they cannot occur here.76

Given these observations, we can posit the following information as the lexical entry for the aspectual have:

(36) \[
\begin{array}{c}
\text{HEAD} \\
\text{POS verb} \\
\text{AUX +} \\
\text{SPR } \langle 1 \rangle \\
\text{COMPS} \langle \text{VP} \left[ \text{VFORM psp} \right] \rangle \\
\end{array}
\]

The interaction of subcategorization and morphosyntactic information is enough to predict the ordering restrictions among modals:

(37) a. He has \( V_P[pp] \) [seen his children].
    b. He will \( V_P[bse] \) [have \( V_P[pp] \) [been \( V_P[prog] \) [seeing his children]]].
    c. He must [have [been [being interrogated by the police at that very moment]]].

(38) a. *Americans have \( V_P[prog] \) [paying income tax ever since 1913].
    b. *George has \( V_P[fin] \) [went to America].

(38a) is ungrammatical since have requires a perfect participle VP. (38b) is out since the following VP is finite.77

76This does not mean that there is no progressive having at all. As in John is having lunch now, the progressive form is determined by meaning.

77One thing to note here is the copula *be and the auxiliary have used as a main verb in British English:

(i) a. John is a student.
    b. John has not enough money.

(ii) a. Is John a student?
    b. Has John enough money? (British English)

As shown in the subject-aux inversion, they both have the AUX feature. One can questions where is the main verb in both cases? Are there any main verbs here? The analysis presented here implies that these are all verbs with the feature AUX: Nothing in the grammar requires the presence of a so-called main verb.
8.3.3 Periphrastic do

The so-called dummy do has several similar as well as different properties compared with other auxiliaries:

First of all, the periphrastic do also exhibits the NICE properties like other auxiliaries:

(39)  
   a. John does not leave the town.
   b. In no other circumstances does John drink alcohol.
   c. They don’t leave the town.
   d. Jane likes the apples, but Mary doesn’t __.

Like other modals, do does not appear in infinitive clauses.

(40)  
   a. *They expected us to do leave him.
   b. *They expected us to can leave him.

There are also some properties that distinguish do from other auxiliaries. First, unlike other auxiliaries, do appears neither before nor after any other auxiliary:

(41)  
   a. *He does be leaving.
   b. *He does have been eating.
   c. *They will do come.

Second, the verb do has no obvious intrinsic meaning to speak of. Except for the grammatical information such as tense and agreement, it does not carry any semantic value. Third, if do itself is positive, then do needs to be emphatic (stressed). But in negative sentences, no such requirement exists.

(42)  
   a. *John does leave.
   b. John DOES leave.

(43)  
   a. John did not come.
   b. John DID not come.

The most economic way of representing these lexical properties seems to assume that the periphrastic do has the lexical entry given in (44).

\[
\begin{array}{c}
\text{HEAD} \\
\text{POS verb} \\
\text{AUX +} \\
\text{VFORM } \text{fin} \\
\text{SPR (NP)} \\
\text{COMPS (VP)} \\
\text{AUX -} \\
\text{VFORM } \text{bse} \\
\text{SPR (I)}
\end{array}
\]
Like other auxiliaries including modals, *do* is specified to be [+AUX]. The feature specification [+AUX] ensures that like other auxiliary elements, *do* is also sensitive to negation, inversion, contraction, and ellipsis (NICE properties). Further, like other auxiliaries, *do* selects a subject NP and a VP complement whose unrealized subject is structure-shared with its subject (I). Treating *do* as a raising verb like other English auxiliaries is based on typical properties of raising verbs, one of which is that raising verbs allow expletives as their subject:

(45) a. John may leave.
    b. It may rain.
    c. *John may rain.

    b. It did not rain.
    c. *John did not rain.

The [AUX+] specification and raising-verb treatment of *do* enable us to capture its similarities with other auxiliaries and modals. But its differences stem from the lexical specifications on feature values for HEAD|POS and its complement VP.

Unlike auxiliaries have and be, *do* is specified to be fin(ite). This property then accounts for why no auxiliary element can precede *do*.78

(47) a. He might [have left].
    b. He might [do leave].

The first requirement on the complement VP of the auxiliary *do* is [VFORM bse]. This feature specification blocks modals from heading the VP following *do*. Since modals are specified to be [fin], the ungrammaticality of (48) is a natural expectation.

(48) a. *He does can leave here.
    b. He does may leave here.

The lexical entry further specifies that its complement VP be [AUX −]. This requirement will correctly predict the ungrammaticality of examples in (49) and (50).

(49) a. *Jim [DOES [have supported the theory]].
    b. The proposal [DID [be endorsed by Clinton]].

(50) a. *I [do [not [have sung]]].
    b. *I [do [not [be happy]]].

In (49) and (50), the VPs following the auxiliary *do*, stressed or not, bear the feature [+AUX] inherited from the auxiliaries have and be. This explains their ungrammaticality.79

78Like *do*, modals also do not have non-finite forms.

79But note that there are differences between *do* and *don’t* in imperatives and in non-imperatives. One telling difference is that *do* in imperatives can occur before another auxiliary like *be* and *have*.

(i) a. Do be honest!
    b. Don’t be silly!
8.3.4 Infinitival Clause Marker *to*

The auxiliary verbs *to* and *do*, in addition to differing by one phonological feature, *voicing*, differ in one small way: *do* appears only in finite contexts, and *to* only in non-finite contexts.

(51) a. John believed Kim to do leave here.
    b. John believes Kim to leave here.

Other than that, they share the property that they obligatorily take bare verbal complements (hence not modals):

(52) a. *John believed Kim to leaving here.
    b. *John did not leaving here.

In terms of NICE properties, *to* observes the VP ellipsis criterion:

(53) a. Tom wanted to go home, but Peter didn’t want to __.
    b. Lee voted for Bill because his father told him to __.

These properties mean that *to* would have a lexical entry like the following:

(54)

```
[HEAD [POS verb [AUX + [VFORM inf]]]]
```

The lexical entry of *to* is thus similar to that of *do*, in that they both are raising verbs.

8.4 Explaining the NICE Properties

Let us here then see how we can account for the NICE properties that are highly sensitive to the presence of auxiliary verbs.

8.4.1 Auxiliaries with Negation

The English negator *not* leads a double life: one as a nonfinite VP modifier when it is constituent negation and the other as a complement of a finite auxiliary verb when it is sentential negation.

**Constituent Negation:** The properties of *not* as a nonfinite VP modifier can be supported from its similarities with adverbs such as *never* in nonfinite clauses as given in (55):

(55) a. Kim regrets [*never/not [having seen the movie]].
    b. We asked him [*never/not [to try to call us again]].
    c. Duty made them [*never/not [miss the weekly meeting]].

*do* and *don’t* in imperatives also have one distinct property: only *don’t* allows the subject *you* to follow. Their properties indicate that they have different lexical information from those in non-imperatives.

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*do and don’t* in imperatives also have one distinct property: only *don’t* allows the subject *you* to follow. Their properties indicate that they have different lexical information from those in non-imperatives.
If we assume that *not* modifies a nonfinite VP, we can predict its various positional possibilities in nonfinite clauses, as represented the following:

\[
(56) \begin{array}{c}
\langle \text{not} \rangle \\
\text{HEAD}
\end{array}
\begin{array}{c}
\text{POS adv} \\
\text{NEG + MOD (VP[VFORM nonfin])}
\end{array}
\]

This means that the adverb *not* modifies any nonfinite VP, as represented in the following:

\[
(57) \text{Constituent Negation:}
\]

\[
\text{VP[nonfin]} -\text{Adv} \quad \text{MOD} \quad \text{not}
\]

For example, in all the good examples in (58) and (59), *not* simply modifies a nonfinite VP. But in the bad examples, this nonfinite VP modifying lexical constraint is violated.

\[
(58) \begin{array}{l}
a. \text{[Not [speaking English]] is a disadvantage.} \\
b.*\text{[Speaking not English] is a disadvantage.} \\
c.*\text{Lee likes not Kim.}
\end{array}
\]

\[
(59) \begin{array}{l}
a. \text{Lee is believed [not V P[fin] [to like Kim]].} \\
b. \text{Lee is believed to [not V P[fin] [like Kim].} \\
c.*\text{Lee is believed [to V P[fin] [like not Kim]].}
\end{array}
\]

**Sentential Negation:** But in finite clauses, it is well-known that *not* has restricted distributions:

\[
(60) \begin{array}{l}
a. \text{Lee never/ not left.} \\
b. \text{Lee will not leave.}
\end{array}
\]

This is one clear difference between *never* and *not*. *not* can modify a nonfinite VP, but not a finite VP, as further shown by the following contrast:

\[
(61) \begin{array}{l}
a. \text{John could [not [leave the town]].} \\
b. \text{John wants not to leave the town.}
\end{array}
\]

\[
(62) \begin{array}{l}
a. *\text{John not left the town.} \\
b. *\text{John not could leave the town.}
\end{array}
\]

Another difference between *never* and *not* comes from VP ellipsis. Observe the following:
(63)  a. Mary sang a song, but Lee never did __.
    b. *Mary sang a song, but Lee did never __.
    c. Mary sang a song, but Lee did not __.

The data here indicate that not behaves differently form adverbs like never and always in the finite clauses even though it behaves alike in nonfinite clauses.

One possible piece of evidence to differentiate two types of not may come from scope possibilities in an example like (64) (cf. Warner 2000).

(64)    The president could not approve the bill.

The negation here could have the two different scope readings as given in (65).

(65)  a. It would not be possible for the president to approve the bill.
    b. It would be possible for the president not to approve the bill.

The most economical way to differentiate sentential negation from constituent negation seems to assume that the sentential negation is a syntactic complement of a finite auxiliary verb (cf. Kim and Sag 1995, 2002). That is, we can assume that when not is used as a sentential negation, it can be selected by the finite auxiliary verb through the lexical rule:

(66)    Negative Auxiliary Verb Lexical Rule:

\[
\begin{array}{c}
\text{HEAD} \\
\text{COMPS} \langle \Pi \rangle
\end{array}
\] 
\rightarrow 
\begin{array}{c}
\text{HEAD} \\
\text{COMPS} \langle \text{Adv}[\text{NEG +}], \Pi \rangle
\end{array}
\]

This lexical rule means that an auxiliary verb basically selects a complement (\(\Pi\)), but can also be realized as a sentential negation (with \([\text{NEG +}]\)) that selects an \([\text{NEG +}]\) element (not) as an additional complement. This view of negation will then generate the following structure for sentential negation.
As represented here, the negative finite auxiliary verb *could* selects two complements, *not* and *leave the town* and forms a well-formed finite VP.

By treating *not* as having a double life, one as a constituent negation and the other as a sentential negation, we can account for the scope differences in (64) and various other phenomena including VP Ellipsis. For example, the present analysis will assign two difference structures for the sentence (64):

(68)  a. 

```
   VP[AUX +]
    \______________/
   \               /
     V[AUX +]   VP[VFORM bse]
        \___________/
        |            |
        |            |
     could      Adv
        \___________/
        |            |
        |            |
      MOD ⟨⟩       ⟨⟩VP[VFORM bse]
      |            |
      |            |
    not      approve the bill
```

160
In the structure (68a), *not* modifies just a nonfinite VP with narrower scope than *could*. Meanwhile, in (68b), *not* is in the same level as *could* and semantically *not* scopes over *could*. In this case, the feature [NEG +] will be percolated up to the VP and then to the sentence. This structural difference also leads to the difference in the tag questions for these two sentences:

(69)  a. The president [could [not [approve the bill]]], couldn’t/*could he?
    b. The president [[could] [not] [approve the bill]], could/*couldn’t he?

Another welcoming consequence of this analysis involves VP ellipsis which we discuss in section 4.4.

8.4.2 Auxiliaries with Inversion

In forming questions, it is essential to invert the subject and the auxiliary:\(^{80}\)

(70)  a. Are you studying English syntax?
    b. What are you studying nowadays?

The canonical movement approach is to assume that the auxiliary verb is moved in the sentential front position:

\(^{80}\)For the analysis of wh-questions like (70b), see chapter 10.
However, there are certain exceptions that present problems for the analysis of inverted interrogatives via movement transformation. Observe the following contrast:

(72) a. I shall go downtown.
b. Shall I go downtown?

Here there is a semantic difference between the auxiliary verb *shall* in (72)a and the one in (72)b: the former conveys futurity whereas the latter has a deontic sense.

Further, there are inflected forms that only occur in inversion constructions, e.g. the first person singular negative contracted form of the copula illustrated in (73):

(73) a. *I aren’t going,
b. Aren’t I going?

To state such lexical idiosyncrasies, movement approaches run into difficulties.

Notice that English has various Subject-Aux inversion constructions: 81

(74) a. Wish: May she live forever!
b. Matrix Polar Interrogative: Boy, was I stupid!
c. Negative Imperative: Don’t you even touch that!
d. Subjunctive: Had they been here now, we wouldn’t have this problem.
e. Exclamative: Am I tired!

Each of these constructions has its own constraints that can hardly be predicted from other constructions. For example, in ‘wish’ constructions, only the modal auxiliary *may* is possible. In negative imperative, only *don’t* allows the subject to follow. These idiosyncratic properties support a non-movement approach. One effective way is to assume the following Subject-Aux Inversion (SAI) Rule: 82

(75) Subject-Aux Inversion Rule:

81See Fillmore (1999) for detailed discussion.
82Another option is to assume a lexical rule that turns a finite auxiliary verb into an inverted finite one selecting the subject as its complement as well. See Borsley (1989a,b).
This rule licenses an inverted, finite, auxiliary verb to combine with its subject (the SPR value \[2\]) and complements (the COMPS value \([7]\)), forming a well-formed subject-auxiliary inverted phrase. An inverted finite auxiliary verb will have the following lexical information:

\[
\begin{align*}
\langle \text{will} \rangle & \quad \text{HEAD} \\
\langle \text{AUX} + \rangle & \\
\langle \text{INV} + \rangle & \\
\langle \text{NP} \rangle & \quad \text{SPR} \\
\langle \text{VP}[\text{bse}] \rangle & \quad \text{COMPS} \\
\langle \text{1, 2} \rangle & \quad \text{ARG-ST}
\end{align*}
\]

This lexical entry then can license the structure like the following:

\[
(77) \quad S \leftarrow \quad \text{Will you study syntax?}
\]

As given in the structure, the inverted will combines with its subject and VP complement in accordance with the SAI rule.

This analysis hints that there are two types of finite auxiliary verbs: [INV +] and [INV –]. As discussed before, this then mean that as discussed in (72) and (73), the [INV +] shall will only a deontic sense and the [INV +] aren’t can select the first person singular as its subject. Meanwhile, even though the word better is an auxiliary verb, it always carries [INV –] as attested by the following contrast:

\[
(78) \quad \begin{align*}
a. & \quad \text{You better not drink.} \\
b. & \quad *\text{Better you not drink.}
\end{align*}
\]

### 8.4.3 Auxiliaries with Contraction

As we have noticed earlier, the auxiliary verbs can be contracted with the preceding subject or the following negation can be contracted with them.
(79)  
a. They’ll be leaving.
    b. They’d leave soon.

(80)  
a. They wouldn’t leave soon.
    b. They shouldn’t leave soon.

One observed property of negation contraction is the existence of lexical idiosyncrasies as in *willn’t, *amn’t, *mayn’t. Based on such and other observations, we can n’t as a kind of inflectional affix. In the context of the framework we adopt here, we would then posit an inflectional rule as in (81):

(81) N’t Inflection Lexical Rule:

\[
\begin{align*}
\text{PHON} & \langle \Pi \rangle \\
\text{POS} & \text{verb} \\
\text{HEAD} & \text{fin} \\
\text{VFORM} & \text{AUX +} \\
\Rightarrow & \\
\text{PHON} & \langle \Pi + n’t \rangle \\
\text{HEAD} & \text{fin} \\
\text{VFORM} & \text{AUX +} \\
\text{NEG +} & 
\end{align*}
\]

This means that words like can will turn into can’t with the addition of the NEG feature. As we have seen earlier, the head feature NEG will play an important role in forming tag questions:

(82)  
a. They can do it, can’t they?
    b. They can’t do it, can they?
    c. *They can’t do it, can’t they?

The tagged part needs to have the oppositive value of the NEG feature of the main sentence.

8.4.4 Auxiliaries with Ellipsis

The standard generalization of VPE is that it is possible only after an auxiliary verb as shown in the contrast (83) and (84).

(83)  
a. Kim can dance, and Sandy can __, too.
    b. Kim has danced, and Sandy has __, too.
    c. Kim was dancing, and Sandy was __, too.

(84)  
a. *Kim considered joining the navy, but I never considered __.
    b. *Kim got arrested by the CIA, and Sandy got __, also.
    c. *Kim wanted to go and Sandy wanted __, too.

The data means that the VP complement of an auxiliary can undergo VP ellipsis as long as the context provides its interpretation.

This generalization can be succinctly stated in the form of lexical rule:

(85) VP Ellipsis Rule:
Given this lexical rule, the canonical auxiliary verb can will be changed into a VPE can as following:

\[
\begin{pmatrix}
\text{HEAD} & \text{AUX +} \\
\text{COMPS} & \langle \text{XP} \rangle
\end{pmatrix}
\Rightarrow
\begin{pmatrix}
\text{HEAD} & \text{AUX +} \\
\text{COMPS} & \langle \text{ } \rangle
\end{pmatrix}
\]

Notice here that even though the VP complement in the output is elided in the output, the ARG-ST is intact. This simple lexical rule can explain all the following data:

| (86) Kim must have been dancing and | (87) a. Sandy must have been _, too. |
|    | b. Sandy must have _, too. |
|    | c. Sandy must _, too. |

The elided VP is all the complement of the auxiliary verbs been, have, and must.

The analysis also immediately predicts the behavior VPE after the infinitival marker to that has been taken to be an auxiliary verb, too:

| (88) a. Tom wanted to go home, but Peter didn’t want to _. |
|    b. Lee voted for Bill because his father told him to _. |

| (89) a. Because John persuaded Sally to _, he didn’t have to talk to the reporters. |
|    b. Mary likes to tour art galleries, but Bill hates to _. |

As we have seen earlier, to is a type of auxiliary verb. This means that its complement can be freely elided.

The present system also can account for the contrast we have seen earlier in (63). A similar contrast can be found in the following:

| (90) a. *Mary sang a song, but Lee could never _. |
|    b. Mary sang a song, but Lee could not _. |

The negator not in (90b) is the complement of the finite auxiliary verb could. This means we can apply the VPE lexical rule to could as shown in the following:

\[
\begin{pmatrix}
\langle \text{could} \rangle \\
\text{SPR} \langle \text{NP} \rangle \\
\text{COMPS} \langle \text{VP[\text{bse}] \rangle \\
\text{ARG-ST} \langle \text{NEG +} \rangle
\end{pmatrix}
\Rightarrow
\begin{pmatrix}
\langle \text{can} \rangle \\
\text{SPR} \langle \text{NP} \rangle \\
\text{COMPS} \langle \text{ } \rangle \\
\text{ARG-ST} \langle \text{NEG +} \rangle
\end{pmatrix}
\]

As seen from the output, the VP complement of the auxiliary verb could is not realized as a COMP element. The lexical information (91b) would then project the syntactic structure in (92):
As represented here, the auxiliary verb *could* forms a well-formed head-complement structure with *not*. But as for *never*, consider the following structure:

The adverb *never* modifies a VP through the feature MOD. The head feature MOD guarantees the fact that the adverb selects the head VP it modifies. The absence of this VP then means that there is no VP the adverb can modify. And this results in an ill-formed structure: no well-formed phrasal conditions in our system renders such a structure acceptable.
8.5 Exercises

1. Each of the following sentences contains something (in the parenthesis) that we might want to call an auxiliary. In each case, construct relevant examples that will clarify whether it actually is one.
   (i) a. John got sent to prison. (got)
   b. He ought to leave his luggage here. (ought)
   c. They needn’t sit this exam. (need)
   d. You better not leave it here. (better)
   e. He dared not argue against his parents.

2. Provide an analysis of the grammaticality/ungrammaticality of the following examples. Hint: give a tree structure and then lexical entries.
   (i) a. Ann may spend/*spending/*spends/*spent her vacation in Italy.
   b. It has rained/*raining/*rains/*rain every day for the last week.
   c. Togalog is spoken/*speak/*speaks/*spoke in Philippines.
   d. The roof is leaking/*leaked/*leaks/*leak.
   (ii) a. *Americans have musted pay income tax ever since 1913.
   b. *George is having lived in Toledo for thirty years.
   c. *The house is been remodeling.
   d. *Margaret has had already left.
   e. *A medal was been given to the mayor by the sewer commissioner.
   (iii) a. Sam may have been being interrogated by the FBI.
   b. *Sam may have been being interrogating by the FBI.
   c. *Sam may be had been interrogating by the FBI.

3. Provide tree structures for the following sentences. In addition, mark the SPR and COMPS value on each node and see what kind of grammar rules licenses each phrase:
   (i) a. John is believed to have left the town.
   b. There may have occurred a disaster.
   c. John has sold his car and bought a bicycle.

4. Observe the following data, and explain how we can generate the questions in the following. In so doing, please ensure what kind of lexical rules have been used.
   (i) a. I don’t think we can trust voting computers. [Can we trust them?]
   b. An ape can do this. [Can we do this?]
   In addition, also consider the following examples where we have elliptical parts. Can our system sketched in this chapter also account for such examples? If it can, explain how. If it cannot, state why not.
   (ii) a. I don’t think we can trust voting computers. [Can we?]
   b. An ape can do this. [Can we?]

5. English allows so called negative inversions as seen from the following contrast:
(i) a. There was hardly any rain falling.
   b. I did little know that more trouble was just around the corner.
   c. I have never been spoken to so rudely!

(ii) a. [Hardly] was there any rain falling.
   b. [Little] did I know that more trouble was just around the corner.
   c. [Never] have I been spoken to so rudely!

Draw tree structures for the sentences (ii) and provide the lexical entries for hardly, little and never. In addition, think of how your analysis can account for the unacceptable examples in the following:

(iii) a. As a statesman, he scarcely could do anything worth mentioning.
   b. As a statesman, scarcely could he do anything worth mentioning.
   c. *As a statesman, scarcely he could do anything worth mentioning.
   d. *As a statesman, he scarcely couldn’t do anything worth mentioning.

6. Read the following passages and analyze the bracketed sentences as far as you can.

(i) It’s time for a frank talk. And no, it can’t wait. We know, we know: Most of you are sick to death of blogs. Don’t even want to hear about these millions of online journals that link together into a vast network. And yes, there’s plenty out there not to like. Self-obsession, politics of hate, and the same hunger for fame that has people lining up to trade punches on The Jerry Springer Show. Name just about anything that’s sick in our society today, and it’s on parade in the blogs. On lots of them, even the writing stinks. Go ahead and bellyache about blogs. But [you cannot afford to close your eyes to them], because they’re simply the most explosive outbreak in the information world since the Internet itself. And they’re going to shake up just about every business – including yours. It doesn’t matter whether you’re shipping paper clips, pork bellies, or videos of Britney in a bikini, blogs are a phenomenon that you cannot ignore, postpone, or delegate. Given the changes barreling down upon us, blogs are not a business elective. They’re a prerequisite.83

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83From http://www.businessweek.com/magazine/content/05_18/b3931001

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Passive Constructions

9.1 Introduction

One important aspect in doing syntax is capturing systematic relations between related constructions. For example, the following two sentences are similar in their meanings:

(1)  
a. One of Korea’s most famous poets wrote these lines.
    b. These lines were written by one of Korea’s most famous poets.

We recognize (1b) as the passive counterpart of the active sentence (1a). These two sentences are truth-conditionally no different: they both describe the event of writing the lines by one Korean poet. In terms of semantic roles, the one who wrote the lines and the things that he or she wrote are all identical. The only difference is the grammatical functions: In the active voice (1a), *one of Korea’s most famous poets* is the subject, whereas in the passive voice (1b), *these lines* is the subject.

Observing these relationships, the question that follows is why do we use different voices in expressing or describing the same situation or proposition? It is generally accepted that passive sentences are used for certain discourse reasons. For example, when it is more important to draw our attention to the person or thing acted upon, we use passive. Compare the following:

(2)  
a. Somebody apparently struck the unidentified victim during the early morning hours.
    b. The unidentified victim was apparently struck during the early morning hours.

We can easily notice here that the passive in (2b) assigns more attention to the victim than the active in (2a). In addition, when the actor in the situation is not important, it is recommended to use the passive voice:

(3)  
The aurora borealis can be observed in the early morning hours.

Similarly, we use the passive voice in formal, scientific, or technical writing or reports to place an emphasis or an objective view in the process or principle being described. For example, compare the following pair:

(4)  
a. I poured 20cc of acid into the beaker.
b. 20cc of acid was poured into the beaker.

It is clear that unlike the active sentence (4a), the passive sentence (4b) assigns a more objective perspective to the meaning of the sentence.

In this chapter, leaving aside these discourse properties of passive constructions, we will look into the syntactic and semantic relationships between active and passive and the properties of different passive constructions.

9.2 Relationships between Active and Passive

Consider the two canonical active and passive counterpart sentences:

(5) a. The executive committee approved the new policy.
    b. The new policy was approved by the executive committee.

**Grammatical Functions and Subcategorization:** As observe, one of the main differences between the active and the passive, we first is that the passive sentence promotes the active object into the passive subject while it demotes the active subject into an optional PP (headed by by). We can observe that the complement of the main verb is missing, and the subject of the sentence has the main properties of this missing element. For example, the active transitive verb taken or chosen must have its object:

(6) a. John has taken Bill to the library.
    b. John has chosen Bill for the position.

(7) a. *John has taken _ to the library.
    b. *John has chosen _ for the position.

However, in the passive, the object NP must be absent. That is, it must not appear right after the passive verb:

(8) a. *John has been [taken Bill to the library].
    b. *John has been [chosen Bill for the position].

(9) a. John has been [taken _ to the library].
    b. John has been [chosen _ for the position].

The absence of the object in the passive is due to the fact that the object of the verb is promoted to the subject in the passive.

The other subcategorization requirement stays unchanged. For example, the active handed requires an NP and a PP[to] as its complements, and the passive handed still requires the PP as its complement:

(10) a. Pat handed Chris a book.
    b. *Pat handed Chris.
(11)  a. Chris was handed a book (by Pat).
     b. Chris was handed (by Pat).

**Morpho-syntactic changes:** In addition to such changes in the grammatical functions, the passive also adds the auxiliary verb *be* and changes the verb form of the active main verb into the *passive*. Such changes happen even when we have more than one auxiliary verb:

(12)  a. John drove the car. → The car was driven.
     b. John was driving the car. → The car was being driven.
     c. John will drive the car. → The car will be driven.
     d. John has driven the car. → The car has been driven.
     e. John has been driving the car. → The car has been being driven.
     f. John will have been driving the car. →
        The car will have been being driven.

**Raising Properties:** The third important property, following from the fact that the active object is promoted to the passive subject, is that the passive construction is similar to the raising construction whose properties we have seen in Chapter 7. Whatever the active transitive verb requires, it must be the subject of a passive. For example, if the postverbal constituent must be an expletive, so must be the subject. Compare the following:

(13)  a. They believe it/*Stephen to be easy to annoy Ben.
     b. They believe there/Stephen to be a dragon in the wood.

(14)  a. It/*Stephen is believed to be easy to annoy Fred
     b. There/Stephen is believed to be a dragon in the wood.

Or if the postverbal constituent must be a clause, so must be the subject of the passive verb:

(15)  a. Everyone believes/*kicks that he is a fool.
     b. [That he is a fool] is believed/*kicked by everyone.

Finally, if the postverbal constituent can be understood as part of an idiom, so can be the subject:

(16)  a. They believe the cat to be out of the bag.
     b. The cat is believed to be out of the bag.

We thus can conclude that the subject of the passive corresponds to the object of the active.

**Semantics:** In terms of meaning, as noted before there is no change in the semantic role assigned to the arguments. The difference is that the agent denoted by the active subject is expressed as an optional oblique argument of the PP headed by the preposition *by* in the passive:

(17)  a. Pat handed Chris a note.
     b. Chris was handed a note (by Pat)
The observations we have made so far tell us that any grammar needs to capture the following basic facts in passive:

- Passive turns the active object into the passive subject;
- Passive optionally allows the subject to turn into the object of a PP headed by the preposition by;
- Passive leaves the COMPS value unchanged (except the object promoted to the subject);
- Passive makes the appropriate morphological change in the form of the main verb
- Passive leaves the semantics unchanged

### 9.3 Three Approaches

There can be several ways to capture the systematic, syntactic and semantic relationships between active and passive. Given our discussion so far, one can rely on grammatical forms (NP, VP, S, etc), or grammatical functions (SPR and COMPS), or semantic roles (agent, patient), and so forth. In what follows, we will see that we need to refer to all these three notions for a proper treatment of English passive constructions.

#### 9.3.1 From Structural Description to Structural Change

The classical transformational grammar assumes the so-called Passive Formation Rule in terms of structural descriptions (SD) and structural change (SC):

\[(19) \text{ Passive Formation Rule:} \]

\[
\begin{array}{cccccc}
\text{SD:} & X & NP & Y & V & NP & Z \\
1 & 2 & 3 & 4 & 5 & 6 \\
\end{array}
\]

\[
\begin{array}{cccccc}
\text{SC:} & 1 & 5 & 3 & \text{be} & 4+en & 6 \text{ (by 2)} \\
\end{array}
\]

This rule means that if there is anything that fits the SD in (19), it will be changed into the given SC: that is, if we have any string in the order of “X – NP – Y – V – NP – Z” (in which X, Y, and Z are variables), the order can be changed into “X – NP – Y – be – V+en – Z – by NP”. For example, consider one example:
Yesterday, the child really kicked a monkey in the street.

As noted here, the main change that occurs in the SC is that the first NP became an optional PP whereas the second NP became the first NP. The change also accompanies the addition of *be* and the change of the verb form into the passive. Even though this SD-SC style rule can handle basic facts for passivization, it leaves many questions unanswered. For example, this does not answer questions like why we have such a SD-SC operation, whether this rule can cover all the facts related to English passivization, and what triggers such a movement.

### 9.3.2 A Transformational Approach

A more elaborated approach is a transformational approach assuming a passive movement operation represented in the following:

The operation basically moves the object *Hill* to the subject position. This kind of movement analysis is based on the following three basic assumptions:

- **Move α**: Move anything anywhere (as long as the movement observes general principles)
- **Case Theory**: Every NP needs to get Case (nominative (NOM) or accusative (ACC)). The subject gets NOM case from tense, and the object gets ACC from an active transitive verb.
- A passive participle does not license ACC case.

These basic assumptions are taken to trigger the movement of *Hill*. That is, the NP *Hill* in (21) does not have ACC case since the passive participle *deceived* cannot assign any case. This

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84 In English, case appears only on pronouns: *he* is nominative, whereas *him* is accusative.
would violate the Case Theory requiring every NP to have a case. To salvage this case violation, the NP must be moved to the subject position whose case is assigned by the tensed verb was.

This kind of movement or derivational analysis is an improvement, compared to the SD-SC analysis. However, it still suffers from problems. For example, this kind of analysis relies on the configurational structure only, it is hard to explain cases where we need to refer to grammatical functions or semantic roles, which we will discuss in what follows.

9.3.3 A Lexicalist Approach

Unlike the movement (or transformational) approach that relies on the tree structure, we can resort to the lexical properties of passive verbs. We can observe that there are many exceptions to passives. For example, transitive verbs like resemble do not have any passive counterpart:

(22) a. John resembles his father.
    b. *His father is resembled by John.

These transitive verbs meet the SD requirement or the tree structure in (21), but cannot be passivized.

There are also verbs like rumor used only passive forms, as observed from the following contrast:

(23) a. It is rumored that he is on his way out.
    b. John is said to be rich.
    c. He is reputed to be a good scholar.

(24) a. *Someone rumors that he is on his way out.
    b. *They said him to be a good teacher.
    c. *They reputed him to be a good scholar.

Neither the SD-SC approach nor the movement approach can predict such lexical idiosyncrasies.

One easiest way of capturing the fact that not all but a limited set of transitive verbs can undergo a passive lexical rule is to adopt a lexical rule like the following:

(25) Simple Passive Lexical Rule (to be revised):

\[
\begin{align*}
\text{tran-v} & \quad \Rightarrow \quad \text{pass-tran-v} \\
\text{HEAD} | \text{POS verb} & \quad \Rightarrow \quad \text{HEAD} [\text{POS verb VFORM pass}] \\
\text{SPR } & \quad \Rightarrow \quad \text{SPR } \langle 2 \rangle \\
\text{COMPS} & \quad \Rightarrow \quad \text{COMPS} \langle 2, \ldots, (PP[by 1]) \rangle
\end{align*}
\]

There exist more verbs that are typically used in the passive as in be born, be deemed, be stranded, be taken aback, etc.
This rule simply says that if there is a transitive verb \((\text{transitive})-\text{v}\) lexeme selecting one SPR and at least one COMPS element,\(^{86}\) there is another verb \((\text{pass-trans-v})\) which selects the first COMPS in the input as its SPR (subject) and an optional PP\([by]\) with the the remaining COMPS value unchanged.\(^{87}\)

Notice that this lexical rule is not precise enough. For example, consider the following:

(26)  a. He kicked the ball. vs. The ball was kicked by him.
    b. John kicked him. vs. He was kicked by John.

We can observe that the active subject is changed from \(he\) to \(him\), indicating that we need to change the case value from nominative to accusative, or just refer to the index value of the active subject like the following reformulated one:

\[\begin{align*}
\text{(27) Passive Lexical Rule (Revised):} \\
\left[ \begin{array}{c}
\text{HEAD} | \text{POS verb} \\
\text{SPR} \langle \text{NP}\rangle \\
\text{COMPS} \langle \text{NP}, \ldots \rangle \\
\end{array} \right] & \Rightarrow \\
\left[ \begin{array}{c}
\text{HEAD} \left[ \begin{array}{c}
\text{POS verb} \\
\text{VFORM pass} \\
\end{array} \right] \\
\text{SPR} \langle \text{NP}\rangle \\
\text{COMPS} \langle \ldots , (\text{PP}[by]) \rangle \\
\end{array} \right]
\end{align*}\]

The revised Passive Lexical Rule now refers to the index value of the SPR and COMPS value, avoiding the issue of changing the case values of the arguments.

Let us consider one simple example first:

(28)  a. John sent her to Seoul.
    b. She was sent to Seoul.

The active verb \(sent\) is turned into the passive verb \(sent\) by the Passive Lexical Rule in (27):

\[\begin{align*}
\left[ \begin{array}{c}
\langle \text{send} \rangle \\
\text{HEAD} | \text{POS verb} \\
\text{SPR} \langle \text{NP}\rangle \\
\text{COMPS} \langle \text{NP}, \text{PP}[to] \rangle \\
\end{array} \right] & \Rightarrow \\
\left[ \begin{array}{c}
\langle \text{sent} \rangle \\
\text{HEAD} \left[ \begin{array}{c}
\text{POS verb} \\
\text{VFORM pass} \\
\end{array} \right] \\
\text{SPR} \langle \text{NP}\rangle \\
\text{COMPS} \langle \ldots , (\text{PP}[by]) \rangle \\
\end{array} \right]
\end{align*}\]

As seen from the output, the passive \(sent\) takes a SPR whose index value is identical to that of the object in the input. The passive \(sent\) also inherits the PP\([to]\) complement and selects an optional PP whose index value is identical to the SPR (subject) of the input.\(^{88}\)

This output lexical entry will then assign the following structure to (28b): 

\(^{86}\)A lexeme is an abstract unit of morphological analysis. For example, \(drive, drives, driving, drove, drive\) are forms of the same lexeme DRIVE. In this sense, we can take a lexicon to consist of lexemes as headwords.

\(^{87}\)Verbs like \(resemble\) will thus not undergo such a lexical rule whereas \(rumor\) exists only as a type of \(pass-trans-v\).

\(^{88}\)As noted in 6.5.2, the preposition functioning as a marker rather than a predicate does not contribute to the meaning of the head PP. This makes its index value identical to that of its object NP.
As given in the structure, the passive *sent* combines with its PP[to] complement, forming a VP that still requires a SPR. This VP also functions as the complement of the auxiliary *be*. Since *be* is a raising verb as given here again in (31), its subject (SPR value) is identical to its VP complement’s subject.\(^{89}\)

\[(31)\]  
\[
\begin{array}{c}
\langle\text{be}\rangle \\
\text{HEAD}\ | \ 	ext{POS verb} \\
\text{SPR } \langle 2 \rangle \\
\text{COMPS} \langle \text{VP} \rangle \\
\end{array}
\]

The raising property of *be* thus ensures that its SPR value is identical with the VP complement’s SPR value. This SPR requirement on *be* will be passed up to the highest VP in accordance with the VALP. When this VP combines with the subject *Stephen* in accordance with the HeadSpecifier Rule, we will have a well-formed passive sentence.

The Passive Rule can be applied to sentences including a CP complement too. Consider the following examples:

(32)  
\[\text{a. They widely believed that John was ill.}\]  
\[\text{b. That John was ill was widely believed.}\]

The application of the Passive Lexical Rule to the active *believed* will generate the passive output:

\(^{89}\)Chapter 7 for the basic properties of raising verbs and adjectives.
The output passive believed then can project the following structure:

We can notice that each local structure is licensed by the grammar rules (the Head-Complement, Head-Modifier Rule and Head-Specifier Rule) as well as the general principles HFP and VALP.

The same account goes even for the examples where the object is an indirect question:

(35)  a. They haven’t decided [which attorney will give the closing argument].
    b. [Which attorney will give the closing argument] hasn’t been decided (by them).

The active decided selects an indirect question as its complement.\(^{90}\) Nothing blocks us from applying the Passive Lexical Rule (27) to this verb:

\(^{90}\)We assume that indirect or direct questions both have the feature QUE(STION). See Chapter 10.
The passive verb *decided* selects the optional PP complement and an indirect question subject. The auxiliary verb *been* combines with the lowest VP. Since *been* is a raising verb, its subject is identical with the VP complement’s subject. The auxiliary raising verb *has* also combines with its complement VP whose subject is identical with its own subject. In this way, the subject of *has* is identical with that of the passive verb *decided*.

### 9.4 Prepositional Passive

In addition to the passivization of an active transitive verb, prepositional verbs can also have passive:
(38)  a. You can rely on Ben.
    b. Ben can be relied on.

(39)  a. They talked about the scandal for days.
    b. The scandal was talked about for days.

This kind of passive examples is unexpected if we apply a passive operation only to transitive verbs. Neither the SD-SC analysis nor the transformation approach can account for such examples. The present analysis also needs a revision to deal with such cases.

One thing we can notice is that even though such verbs select a PP complement, the passive verbs here form a coherent syntactic unity with the following preposition. Observe the following contrast:

(40)  a. They talked repeatedly about the scandal for days.
    b. You can rely absolutely on Ben.

(41)  a.*The scandal was talked repeatedly about for days.
    b.*Ben can be relied absolutely on.

As shown in the contrast, unlike the active, the passive allows no adverb to intervene between the passive verb and the preposition.

The difference between active and passive further can be attested by a constituent test:

(42)  a. It was about the scandal that they talked for days.
    b. You can rely on Ben and on Maja.

(43)  a. *It was about for days that the scandal was talked repeatedly.
    b. *Ben can be relied absolutely on and completely on.

As for the behavior of active examples here, we can simply assume that such prepositional verbs select a PP complement:

(44)  \[
    \begin{array}{c}
    \text{S} \\
    \text{NP} \quad \text{VP} \\
    \text{They} \quad \text{V} \quad \text{PP} \\
    \text{talked} \quad \text{about the scandal}
    \end{array}
\]

This structure will then expect an adverb or adverbial phrase intervene between V and PP as a modifier. Yet for the passive, in order to predict the cohesion between the passive verb and the preposition following the verb, we need to have one of the following two structures:
Both of these structures may capture the fact that no elements can appear between the prepositional verb and the preposition since the preposition is in a sense a complement of the verb. Even though both (45a) and (45b) have their own merits, we choose the structure (45b). No grammar rules that we have introduced the combination of V with P, forming another V. The structure similar to (45b) has been already adopted for the analysis of verb-particle constructions in Chapter 2. For (45b), the only mechanism we need to introduce is to ensure the selected preposition of the prepositional verb to function as its complement (just like a particle). The following Passive Lexical Rule will do our justice:

(46) Prepositional Passive Lexical Rule:

\[
\begin{align*}
\text{prepositional-v} & \quad \text{SPR } \langle \text{NP}_i \rangle \\
\text{COMPS } \langle \text{PP}_{\text{PFORM by}} \rangle & \quad \Rightarrow \\
\text{VFORM \_pass} & \quad \text{SPR } \langle \text{NP}_j \rangle \\
\text{COMPS } \langle \text{PFORM by} \rangle & \quad \text{COMPS } \langle \text{PFORM by} \rangle
\end{align*}
\]

This rule ensures that a prepositional verb (\textit{prepositional-v}) can have its counterpart passive verb.\(^{91}\) The output passive prepositional verb selects a SPR whose index value is identical to the input verb’s PP complement. The output can select two complements: a preposition and an optional PP complement. This preposition is identical with the PFORM value of the input PP.

Consider the following example:

(47) a. The lawyer looked closely into the document.

b. The document was closely looked (*closely) into by the lawyer.

The prepositional verb \textit{look} will undergo the rule in (46) and generates a passive output:

\(^{91}\)Verbs selecting a PP can be divided at least into two groups: prepositional verbs and non-prepositional verbs. For example, verbs like \textit{look, come, live, recover} select a PP complement but are not prepositional verbs since they do not have passive counterparts.
The output passive now selects a preposition and an optional PP as its complement and a subject NP. This will generate a structure like the following:

(49) \[
\begin{array}{c}
\text{looked} \\
\text{VFORM pass} \\
\text{COMPS} \langle \text{P[into]}, \text{PP[by]} \rangle
\end{array}
\]

Since the preposition into is now the complement of the passive verb, nothing can intervene between the passive verb and the preposition as we have seen earlier.

9.5 Constraints on the Affectedness

Earlier, we noted that verbs like resemble do not have passive forms even if there are transitive verbs. There seem to exist other verbs with no passive counterparts:

(50) a. They have a nice house.
    b. He lacks confidence.
    c. The coat does not fit you.

(51) a. *A nice house was had by them.
    b. *Confidence is lacked by him.
    c. *You are not fit by the coat.

One can claim that these verbs lexically do not allow passive since they are inherently stative. However, observe the following contrast:

(52) a. *Great wealth was possessed by the King.
    b. *Oil is held by the jar.

(53) a. The city was soon possessed by the enemy.
    b. The thief was held by the police.

Why do have such a contrast? It appears that the semantic role assigned to the object seems to play a key role. Observe the following further:

(54) a. *Jill was married by Jack.
b. *Four is equalled by two and two.

(55)  a. They were married by the priest.
      b. He is equalled in strength by no one.

Though *married and *equalled generally do not allow passive, they can be passivized when the passive subject is influenced or affected by the action denoted by the main verb. This affected condition can be further found in the following contrast:

(56)  a. *Six inches were grown by the boy.
      b. *A pound was weighed by the book.
      c. *A mile to work was run by him.

(57)  a. The beans were grown by the gardener.
      b. The plums were weighed by the greengrocer.
      c. A mile was first run in four minutes by Bannister.

The main difference between possible and impossible examples here is that the passive subject is acted upon by an agent. That is, the passive subject is physically or psychologically affected by the action performed by the agent.92

The addition of this kind of ‘affectedness condition’ can account for the contrast in (56a) and (57b). Six inches cannot be affected by the action performed by the agent. But beans are under the direct influence from the action denoted by the gardener. The ‘affectedness condition’ can also predict the following contrast:

(58)  a. *The bridge was walked under by several students.
      b. This bridge has been walked under by generations of lovers.

Even though the bridge will be not affected by some students who walked under the bridge by chance, it can have a new status when lovers choose the bridge as a regular dating course.

9.6 Other Types of Passive

9.6.1 Adjectival Passive

The passive verbs in general have verbal properties. However, there are cases with adjectival properties.

(59)  a. Her actions embarrassed him.
      b. His success elated him.

(60)  a. He was embarrassed by her actions.
      b. He was elated by his success.

These passives, though having corresponding actives, exhibit adjectival features as can be seen from the following contrast:

(61)  a. His actions much/+very embarrassed her.

92 This kind of semantic relation can be easily added on the semantic relations (RELS) in the process of passivization.
b. His success much/*very elated him.
c. Her failure much/*very concerned her.

(62) a. He was *much/very embarrassed by her actions.
b. He was *much/very elated by his success.
c. She was *much/very concerned by her failure.

Though the active verb in (61) can occur with the verb-modifying adverb much, the passive verb in (62) cannot. It can occur only with the adjective modifying adverb very.

One additional constraint on these verbs is that many of these semi-passives have prepositions other than by:

(63) a. They were all worried about the accident.
b. I was surprised at her behavior.
c. They are satisfied with his actions.
d. John is interested in linguistics.

We can represent such semi adjectival passive formation examples as a rule:

(64) Adjectival Passive Lexical Rule:

\[
\begin{align*}
\text{HEAD}\vert\text{POS verb} & \Rightarrow \text{HEAD}\vert\text{POS adj} \\
\text{SPR} \langle \text{NP}_i \rangle & \Rightarrow \text{SPR} \langle \text{NP}_j \rangle \\
\text{COMPS} \langle \text{NP}_j \rangle & \Rightarrow \text{COMPS} \langle \text{PP}_i \rangle 
\end{align*}
\]

As given here, the output now functions as an adjective with no specific constraint on the PFORM value. The output of this lexical rule can generate a structure like the following:

(65) S

```
               S
               /\        
              /  \       
             NP   VP
                /\    /\  
               /  \ /  \ 
              He   V   AP
                 /\   /\  
                /  \ /  \ 
               was Adv AP
                  /\   /\  
                 /  \ /  \ 
                very A  PP
                   /\   
                  /  
                 surprised (at her actions)
```

9.6.2 Get Passive

In certain environments, passives allow get instead of be:

(66) a. I got phoned by a woman friend.
b. Rosie got struck by lightning.
c. He got hit in the face with the tip of a surfboard.
d. Women get terribly worried about that.
e. When I start reading, I get motivated.
f. John’s bike got fixed or got stolen.

Get passives usually convey the speaker’s personal involvement or reflect the speaker’s opinion as to whether the event described is perceived as having favorable or unfavorable consequences. This is why it is rather unacceptable to use the get passive when the subject-referent has no control over the process in question:

(67)  a.*The lesson got read by a choirboy.
b.*The letter got written by a poet.
c.*Tom got understood to have asked for a refund.
d.*Mary got heard to insult her parents.

This means that the verb get selects a VP[pass] with an additional semantic or pragmatic condition. Its simple lexical entry will be something like the following:  
(68)  
\[
\begin{array}{c}
\langle \text{get} \rangle \\
\text{HEAD}\vert\text{POS} \text{ verb} \\
\text{VAL} \begin{cases} \\
\text{SPR} \{\text{NP} \} \\
\text{COMPS} \{\text{VP[pass]} \} \\
\text{ARG-ST} \{\text{par}, \text{E} \}
\end{cases}
\end{array}
\]

This will then generate a structure like the following:

(69)

In terms of structure, get-passives are not different from be-passives.

9.7 Middle Voice

In addition to the active and passive voices, in English there exists another voice, often called ‘middle’. Consider the following:

\[93\] With a more elaborated feature structure for pragmatic information, we can formulate this in the feature structure system.
(70) a. John opened the door.
    b. John cooked the casserole in the oven.

(71) a. The door was opened by John.
    b. The casserole was cooked in the oven by John.

(72) a. The door opened.
    b. The casserole cooked in the oven.

The sentences in (71) are passive forms of those in (70). Then what about (72)? The subject here is identical with that of the passive, but the verb is not in the passive but in the active form. As such, an intransitive verb that appears to be active but expresses a passive action characterizes the English middle voice. That is, we can say that English middle voices are syntactically active but semantically passive:

(73) a. John rang the bell. → The bell rang.
    b. John broke the window. → The window broke.
    c. John smashed the vase. → The vase smashed.
    d. John melted the ice. → The ice melted.
    e. John sank the ship. → The ship sank.

However, not all transitive verbs have middle voices:


Such middle voices in general describe permanent properties of the subject. This general semantic condition makes middle voice incompatible with duration adverbs:

(75) a. ??This car drove smoothly last night.
    b. ??This clothes washed well last night.

In addition, these middle verbs do not allow the by phrase:

    b. *The window broke by the child.
    c. *The vase smashed by the baby.

Given these observations, we can introduce the following lexical rule for a limited set of transitive verbs in English:

94 The double question marks mean that such a sentence is in general unacceptable, but can be used in certain context.
The lexical rule means that a verb selecting an agent and a theme argument can be turned into a verb selecting this theme as the subject. For example, consider the verb open:

(78) \[
\begin{align*}
\langle \text{open} \rangle \\
\text{VAL} & \langle \text{NP}_i \rangle \\
\text{SPR} & \langle \\
\text{COMPS} & \langle \\
\text{ARG-ST} & \langle \text{agt}, \text{th} \rangle
\end{align*}
\]
\Rightarrow
\begin{align*}
\langle \text{open} \rangle \\
\text{SPR} & \langle \text{NP}_j \rangle \\
\text{COMPS} & \langle \text{ } \rangle
\end{align*}

There is no change in the ARG-ST. The output realizes the input verb’s theme argument as its subject.

(79) 

Though such a lexical process can add a special semantic and pragmatic meaning (such as describing permanent properties), it is another way of expanding lexical usages.
9.8 Exercises

1. Draw the complete tree diagram for each of the following sentences and then provide the lexical entry for the italicized passive verb.
   (i) a. Peter has been asked to resign.
       b. I assume the matter to have been filed in the appropriate records.
       c. Smith wants the picture to be removed from the office.
       d. The events have been described well.
       e. Over 120 different contaminants have been dumped into the river.
       f. Heart disease is considered the leading cause of death in the United States.
       g. The balloon is positioned in an area of blockage and is inflated.

2. Consider the following examples and provide the putative active counterpart.
   (i) a. That we should call the police was suggested by her son.
       b. Whether this is feasible hasn’t yet been determined.
       c. Paying taxes can’t be avoided.
       Also see if there is any relationships between the above sentences with the following passives:
   (ii) a. It was suggested by her son that we should call the police.
       b. It hasn’t yet been determined whether this is feasible.
       c. It can’t be avoided paying taxes.

3. The verbs like get and have can be used in so-called pseudo passives:
   (i) a. Frances has had the drapes cleaned.
       b. Shirley seems to have forgotten Fred promoted.
   (ii) a. Nina got Bill elected to the committee.
       b. We got our car radio stolen twice on holiday.
       Check if we can replace the italicized verbs with different verb forms (e.g., base or infinitive) and then discuss if such a replacement test can tell us anything about the properties of such constructions. In addition, provide the tree structures for the sentences with the lexical entries for have, get, and the italicized verbs.

4. The following sentences appear to have similar meanings. Discuss the relationships among the following sentences if you can find any.
   (i) a. Joe rolled the barrel down the hill.
       b. Joe had the barrel rolled down the hill.
       c. The barrel was rolled down the hill.
       d. The barrel rolled down the hill.

5. Consider the following passive examples.
   (i) a. We cannot put up with the noise anymore.
       b. He will keep up with their expectations.
   (ii) a. This noise cannot be put up with.
b. Their expectations will be kept up with.

Do the Passive Lexical Rules proposed in this chapter explain such? Also observe the following examples which have two different kinds of passive:

(iii) a. They paid a lot of attention to the matter.
     b. The son took care of his parents.

(iv) a. The matter was paid a lot of attention to.
     b. A lot of attention was paid to the matter.

Can you think of any way to account for such examples?

6. Check if the following verbs are middle verbs or not. In so doing, try to construct relevant examples.

(i) fill, break, withdraw, move, march, jump, load

Also consider the following examples:

(ii) a. These shirts wash *(well).
     b. The meat cuts *(easily).
     c. The books sell *(well).

In these examples, the presence of an adverb is obligatory. Are they any other verbs that behave like these? Also, provide a lexical rule that can capture such a middle formation operation.

7. Read the following passage and identify the errors in the verb’s verb form. In addition, provide the lexical information for the corrected form.

(i) This survey aim at investigating the effectiveness of the appraisal system in our company. The survey conduct last month. The data collect by means of a questionnaire survey and three focus group interviews. In the questionnaire, respondents ask ten questions regarding the current appraisal system. It find that the respondents generally quite satisfy with the system, but about half of them state it should carry less frequently. In the focus group interviews, the respondents give the opportunity to discuss the system openly. Some respondents complain that the appraiser know too little about them to give detailed and objective comments. The findings indicate that the rationale for conducting the appraisal exercise should explain more clearly to our staff.
Wh-Questions

10.1 Clausal Types and Interrogatives

Like other languages, English also distinguishes a set of clause types that are characteristically used to perform different kinds of speech acts:

(1) a. Declarative: John is clever.
   b. Interrogative: Is John clever? Who is clever?
   c. Exclamative: How clever you are!
   d. Imperative: Be very clever.

Each clause type in general has its own functions to represent speech acts. For example, declarative makes a statement, interrogative asks a question, exclamative makes an exclamatory statement, and imperative issues a directive.

As for the interrogative, there are basically two types, yes-no question and wh-question:

(2) a. Yes-No questions: Can the child read the book?
   b. Wh-questions: What can the child read?

Yes-no questions are different from their declarative counterparts by having subject and auxiliary verb in the reverse order. As we have seen in Chapter 8, such yes-no questions are generated from the combination of an inverted finite auxiliary verb with its subject and complement in accordance with the SAI Rule:
Meanwhile, wh-questions, in addition to the subject-auxiliary inversion, introduce one of the interrogative words who, whom, whose, what, which, when, where, why, and how. These wh-phrases have a variety of functions in the clause. For example, they can be subject, object, as well as subject complement:

(4) a. [Who] called the police?
    b. [Which version] did they recommend?
    c. [What] are they?
    d. [What] did John give to Bill?

The wh-questioned phrase need not be an NP. It can be a PP, AP, or AdvP as well:

(5) a. [NP Which man] [did you talk to __]?
    b. [PP To which man] [did you talk __]?
    c. [AP How ill] [has Hobbs been __]?
    d. [AdvP How frequently] [did Hobbs see Rhodes __]?

As noted here, in terms of the structure, wh-questions consist of two parts: a wh-phrase and an inverted sentence with a missing phrase which is linked to the wh-phrase. The filler wh-phrase must be identical with the gap with respect to the syntactic category:

(6) a. *[PP To which man] [did you talk to [NP __]]?
    b. *[NP Which man] [did you talk [PP __]]?

Another important point property is that the distance between the filler and the gap is not bound within one sentence: It can be long-distanced:

(7) a. [[Who] do you think [Tom saw __]]?
    b. [[Who] do [you think [Tom said [he saw __]]]]?
    c. [Who] do [[you think [Tom said [he imagined [that he saw __]]]]]

As can be observed here, the link between the filler and the gap is appropriate, the distance between the two can be long-distance or unbounded. This long distance relationship gives wh-questions and other similar constructions the name of ‘long-distance dependency’.
10.2 Movement vs. Feature Percolation

Traditionally, there have been two different ways to link the filler wh-phrase with its missing gap. One traditional way of linking the two is to assume that the filler wh-phrase is moved to the sentence initial position from its allegedly original position as represented in (8).

The wh-phrase who is originally in the object of recommend and then moved to the specifier position of the intermediate phrase C'. The auxiliary verb will is also moved from the V position to the C. This kind of movement operation at first glance can be appealing in capturing the linkage between the two. However, moving an overt element to form a wh-question immediately runs into a problem for examples like the following:

(9) a. Who did Kim work for and Sandy rely on _ ?
   b. *Who did Kim work for _ and Sandy rely on Mary?

If we adopt a movement process for such examples, there must be an operation that the two NP gaps are collapsed into one NP and become who. We cannot simply move one NP, because it will generate an ill-formed sentence like (9b).66

Unlike this kind of movement operation, we can assume that there is no movement process at all to generate such wh-questions, but there exists just a mechanism of feature percolations. In this system, the missing information of a gap is passed up to the tree until it meets the corresponding filler:

---

65 In transformational analyses, the movement of a wh-phrase is often called A'-movement in the sense that the wh-phrase is moved to an non-argument position, e.g., CP's specifier position. Meanwhile, passive constructions are called A-movement since the object is moved to the subject position. In addition, the movement of the auxiliary verb to C is called 'head-movement' in the sense that it is movement from a lexical head to another lexical head C.

66 See section 4 of Chapter 11 for the discussion of examples like (9b).
The notation NP/NP (read as ‘NP slash NP’) or S/NP means that the phrases are incomplete, missing one NP. This missing information is percolated up to the point where it meets a matching filler as its sister.

This kind of feature percolation analysis can account for the contrast in (9a) and (9b). Let us see the partial structures of the two.

Since the mechanism of feature unification allows two nonconflict phrases to be unified into one, we then can expect two S/NP phrases to be merged into one S/NP as in (11a). However, we cannot unify the two different phrases S/NP and S/PP into one since they have conflict missing values, NP and PP.
10.3 Feature Percolation with No Abstract Elements

10.3.1 Basic Systems

Within a more formal way of stating the feature percolation system as sketched in the previous section, we can introduce the feature attribute GAP for an empty phrase and pass this up to the point where the gap value is discharged by its filler. However, even within such an approach, an issue remains open of positing an empty element which is introduced as an abstract entity. This element is an abstract phrase introduced as theoretical reason. Though the introduction of an empty element with no phonological value can be intuitive, this runs into problems for cases like the following:

(12) a. *Who did you see [\(NP[NP\_] \) and \([NP\text{a picture of }[NP\_]]\)]?
    b. *Who did you compare \([NP[NP\_] \) and \([NP\_]]\)?

Within the assumption that empty elements are identical with canonical phrases except for the fact empty elements have no phonological values, nothing would block us from coordinating two empty phrases. It is needless to say that if we can avoid positing empty elements that we cannot see or hear, it would be better in theoretical as well as empirical terms.

One way to do without an abstract element is to encode the gapped or missing information in the lexical head element. For example, the verb recommend can be realized at least in the following two environments:

(13) a. The UN recommended an enlarged peacekeeping force.
    b. These qualities recommended him to Oliver.

(14) a. This is the book which the teacher recommended ___.
    b. Who will they recommend ___?

The verbs recommend in (13) are its canonical realization whereas those in (14) are not. That is, in (13), the object of the verb is right next to it whereas in (14) its object does not occur in the adjacent position, but appears in a nonlocal position. We can represent this difference in the lexical information as following:
This indicates that the verb recommend selecting two arguments seen from the ARG-ST can be realized in two different ways. That is, the syntactic valence information of the verb can be different with respect to how the two arguments are realized. In (15a), the two arguments are realized as the SPR and COMPS value, generating examples like (14a). However, in (15b), the second argument is realized not as a COMPS value but as a GAP value.  

This lexical information in (15b) will eventually project a structure like the following:

In this structure the head verb recommend itself has the GAP information. This GAP value will be passed up to the point where it will be discharged by the filler.

Passing up the GAP information upto the mother from a non-head is ensured by the following principle:

\[ \text{GAP Inheritance Principle (GIP):} \]

The mother’s GAP value is the sum of each daughter’s GAP value minus the bound

\[ \text{97} \]

We thus introduce the feature GAP as a kind of VAL feature.
GAP value.
This GAP value will be percolated up to a higher tree until it meets an appropriate filler and then is discharged. In English this dischargement takes place at the S level in accordance with the following Head-Filler Rule:

\[(18) \text{Head-Filler Rule:} \quad S\left[ \text{GAP } \langle \_ \rangle \right] \rightarrow \text{null}, \quad S\left[ \text{GAP } (\text{null}) \right] \]

This grammar rule says when the head expression S containing a nonempty GAP value combines with its GAP value, the resulting phrase will form a grammatical head-filler phrase, with the discharge of the GAP value.

10.3.2 Non-subject Wh-questions
One thing to note here is that in English only complements can be realized as a GAP value. Unlike languages like Korean or Japanese where both subject and object can be extracted, Indo-European languages including English exhibit subject-object asymmetry in various phenomena. For example, though the object can be easily realized as a gap element, the subject is not: 98

\[(19) \quad \text{a. *I saw the car that you think that John claimed that } \_ \text{ could hit the man} \]
\[\text{b. I saw the car that you think that John claimed that the man could hit } \_ \text{]}

Also observe the following contrast:

\[(20) \quad \text{a. *What did [that John bought } \_ \text{ ] upset Jack?} \]
\[\text{b. What did Julia think [that John bought } \_ \text{ ]?} \]

\[(21) \quad \text{a. *Who is [a book about } \_ \text{ ] being ready by the class?} \]
\[\text{b. Who is the class reading [a book about } \_ \text{ ]?} \]

The data here indicate that an element from the subject is less extractable than one from the complement. 99

Reflecting this subject/object asymmetry, we can assume the Argument Realization Constraint as following: 100

\[(22) \quad \text{Argument Realization Constraint:} \]

The non-initial argument can be realized either as a COMPS element or as a GAP element.

This constraint tells us that the first argument must be realized as the SPR and the remaining arguments are realized as COMPS and GAP value. For example, let’s see the verb put. This verb will select three arguments:

98See (36) also.
99Such a constraint is often called ‘subject island’. See 11.4 for the discussion of the so called ‘island’ constraints.
100The notation \( \ominus \) is an minus operation on the two lists, and \([A]\) is a variable over the list.
Of these three, the first one will be always realized as the SPR element whereas the non-initial two arguments can be realized either as a COMPS or as a GAP element. This means we have at least the following three realizations of put:

\[
\begin{align*}
\text{(24) a. } & \left[ \langle \text{put} \rangle \right] \\
& \left[ \begin{array}{c}
\text{SPR } \langle 1 \rangle \\
\text{VAL}
\end{array} \right] \\
& \left[ \begin{array}{c}
\text{COMPS } \langle 2, 3 \rangle \\
\text{GAP } \langle \rangle
\end{array} \right] \\
& \left[ \begin{array}{c}
\text{ARG-ST } \langle 1, 2, 3 \rangle \\
\end{array} \right]
\end{align*}
\]

\[
\begin{align*}
\text{b. } & \left[ \langle \text{put} \rangle \right] \\
& \left[ \begin{array}{c}
\text{SPR } \langle 1 \rangle \\
\text{VAL}
\end{array} \right] \\
& \left[ \begin{array}{c}
\text{COMPS } \langle 3 \rangle \\
\text{GAP } \langle 2 \rangle
\end{array} \right] \\
& \left[ \begin{array}{c}
\text{ARG-ST } \langle 1, 2, 3 \rangle \\
\end{array} \right]
\end{align*}
\]

\[
\begin{align*}
\text{c. } & \left[ \langle \text{put} \rangle \right] \\
& \left[ \begin{array}{c}
\text{SPR } \langle 1 \rangle \\
\text{VAL}
\end{array} \right] \\
& \left[ \begin{array}{c}
\text{COMPS } \langle 2 \rangle \\
\text{GAP } \langle 3 \rangle
\end{array} \right] \\
& \left[ \begin{array}{c}
\text{ARG-ST } \langle 1, 2, 3 \rangle \\
\end{array} \right]
\end{align*}
\]

Each of these three are meant to be examples like the following:

\[
\begin{align*}
\text{(25) a. } & \text{John put the books in a box.} \\
\text{b. } & \text{Which book did John put in the box?} \\
\text{c. } & \text{Where did John put the book?}
\end{align*}
\]

As we can see here, the verb put in (25a) has the canonical realization of arguments whereas in (25b), the NP argument is realized as a gap and in (25c), the PP is realized as a gap. The structure for (25b) is given in the following:\footnote{We assume that every \text{wh-element} in questions carries the feature [QUE +].}
Let us look at the structure from bottom to top. In the bottom, the verb *put* has one COMPS value together with a GAP value. This means the word will look for this GAP value not at its sister, but in a nonlocal domain. It will pass this GAP information up to the position where it meets its filler. The verb first combines just with the PP *in the box*, forming a head-complement phrase in accordance with the Head-Complement Rule. The VP, which inherits the GAP value from the head daughter *put*, now combines with the subject *John* in accordance with the HeadSpecifier Rule. The result, however, forms an incomplete S in the sense that it still has a GAP value. This GAP value is passed up to the inverted sentence whose head auxiliary verb is *did*. The combination of this [INV +] verb with the gapped S is licensed by the Head-Complement Rule again. The GAP value now finds its filler at its sister, forming a grammatical wh-question.

This kind of feature percolation system, introducing no empty elements, works quite well even for long distance dependency examples. Consider the following:
The GAP value starts from the lexical head saw as given in (28):

\[
\begin{array}{c}
\langle \text{saw} \rangle \\
\text{VAL} \\
\text{SPR} \langle \square \rangle \\
\text{COMPS} \langle \rangle \\
\text{GAP} \langle 2 \rangle \\
\text{ARG-ST} \langle 1, 2 \rangle
\end{array}
\]

Since the verb has its COMPS be realized as its GAP value, it need not look for its complement in its sister. This GAP information, in accordance with the GIP, will be passed up to the second highest S where it is discharged by the filler who in accordance with the Head-Filler Rule in (54). Once again, we can observe that the grammar rules are closely interacting with the general principles such as the HFP and GIP.

It is also easy to verify that this system captures examples like (29) in which the gap is a non-NP phrase:

\[
\begin{align*}
(29) & \quad \text{a. [In which box] did John put the book \underline{?}} \\
 & \quad \text{b. [How happy] has John been \underline{?}}
\end{align*}
\]

It is not difficult to observe that the categorial status of the filler is identical with that of the gap. The structure of (29a) can be represented as following:
10.3.3 Subject Wh-Questions

Now consider examples in which the subject is wh-questioned:

(31) a. Who put the book in the box?
   b. Who can put the book in the box?

When the subject is wh-questioned, the presence of an auxiliary verb is optional, hinting that there may not be even an extraction.

We can assume several structures for such subject wh-questioned sentences. The first structure we can think of is to allow the subject to be gapped and have a structure like the following for (31a):

(32) *S

One obvious problem of this structure is that no grammar rules that we have seen so far will license the combination of the VP with the filler NP *who*: the Head-Filler Rule in (54) requires its head to be an S. If we license this kind of combination, we may generate an ill-formed example like *We Fido like* in which *Fido* is the object.

Another possible structure one can imagine is a structure in which the VP is directly projected into an S, when the subject is gapped:
Even though the gapped S now can combine with the filler *who*, this ignores the subject/object asymmetry we have seen in the examples (19)–(21). It is also untenable to assume that a finite VP with a GAP value can be projected to a sentence.

One simple way of reflecting the subject/object asymmetry is to assume that as we did before, English extraction applies only to complements. As for the wh-subject, the phrase is realized in its position as it is:

(34) S
   ┌─┐
   │ │
   │ V │
   │   │
   │ NP│ PP
   │   │
   └─┘  └─┘

As given here, the structure introduces no GAP value for the subject at all. The verb *put* realizes its subject as a [QUE +] element. This simple structure then predicts the general fact in English that the subject of a clause is more restricted in extraction than the object. One evidence for such an analysis can come from examples like (35):

(35) a. *Who did go home?*

   b. What did make him happy?

The auxiliary verb *do* does not allow its subject to be wh-questioned. This implies that the auxiliary verb *do* lexically specifies that its subject is a canonical syntactic-semantic phrase (called *canonical-synsem*).
10.4 Capturing Subject and Object Asymmetries

However, complication arises from the following contrast:\(^{102}\)

(36)  a. Who do you believe that Sara invited _?  
     b. *Who do you believe that _ invited Sara?

(37)  a. Who do you believe Sara invited _?  
     b. Who do you believe _ invited Sara?

The data show us that the subject can function as a gapped element when there exists no complementizer *that*. In other words, the extraction of the subject is sensitive to the presence or absence of the complementizer *that* whereas that of the object is not. Thus when the complementizer *that* is present, we allow (38a), but not (38b):

(38)  a. CP[GAP (NP)]

```
CP          S
  |    
C   S
  |   
that NP VP
  |   
Sara invited
```

b. *CP[GAP (NP)]

```
CP          VP
  |    
C   VP
  |   
that invited Sara
```

Unlike (38a), (38b) is simply out since the subject of the VP is gapped. The example (37a) is simple in which the object is gapped, as represented in the following structure:

\(^{102}\)There are so-called 'adverbial amelioration effect' sentences like *This is the kind of person who I doubt that, under normal circumstances, would have anything to do with such a scheme*. As in such an example, when an adverb intervenes between *that* and a subject position, extraction of the subject is possible. See Culicover 1993.
Just like (36)a, this sentence also has the object of the embedded clause is gapped. The verb believe combines with this incomplete S.

How can then we account for (39b) in which the subject is extracted? One thing to note here is that such a subject-gapped example is possible only with so-called ‘parenthetical verbs’ like think, imagine, assume and so forth:

(40) a. Who do you believe likes Mary?
    b. Who do you imagine likes Mary?

(41) a. *Who do you know won the prize?
    b. *Who do you recognize won the prize?

All these verbs select either an S or CP as their complement:

(42) a. I believe that Mary won the prize.
    b. I know that Mary won the prize.

The data here indicate that the subject extraction is rather lexically controlled. That is, we can assume that a limited set of verbs selecting either a CP or an S can undergo a lexical rule so that they can select a finite VP with their subject lexically realized as a GAP in accordance with the following rule.\(^{103}\)

(43) Subject Extraction Lexical Rule:

\[
\begin{aligned}
\text{parenthetical-verb} & \quad \Rightarrow \quad [\text{HEAD} | \text{POS verb}] \\
\text{HEAD} | \text{POS verb} & \quad \Rightarrow \quad [\text{SPR} (\Pi)] \\
\text{ARG-ST} (\Pi, S) & \quad \Rightarrow \quad [\text{COMPS} (\text{VP} [\text{VFORM fin} \text{GAP} (\Pi)])]
\end{aligned}
\]

This lexical rule means that given a parenthetical verb that selects a finite sentence, we have another counterpart that selects a finite VP with its subject as the GAP value. For example, the verb think selects a finite sentence so that it can undergo the lexical rule in (43):

\[^{103}\text{This rule is reminiscent of the meta rule assumed in Gazdar et al. (1987).}\]
The output of *think* now selects a finite VP with one GAP value. This can generate a structure like the following:

(45)  
```
    S
   / \  
  [NP] [S[GAP [NP] ] ]
     |     |        |        
   Who  V    NP VP[GAP [NP ] ]
     |  |  |        |        
    do you V [VFORM fin ]
     |      |     |    |   
    think V [GAP [NP] ]
     |      |     |    |   
    likes V NP
```

Everything local structure here is well-formed and licensed by the grammar rules and principles. The verb *think* combines with its complement VP *likes Robin*. This finite VP has a GAP value which is identical with the VP’s subject. This GAP value is passed up to the point where it is discharged by the filler *who*.  

The SELR will not apply to verbs selecting a CP. For example, verbs like *wonder* will select a CP so that it cannot undergo this lexical rule:

(46)  
```
```

In addition, verbs like *complain* subcategorize only for a CP in many varieties of English:

(47)  
```
a. Who did you complain that you hated?
```

---

104 One thing to note is that the SELR in (??) introduces the GAP value at the VP level, not at the VP level. This means that the GAP value introduced by this rule is not sensitive to the ARC in (22) which applies only to *word* level expressions.
b. *Who did you complain you hated?

In sum, by admitting that English has subject and object asymmetry and does not basically allow the subject to be gapped, we can account for relevant facts rather easily. Of course, in this process, we also need to introduce a lexical rule to account for the examples where the subject seems to be gapped.

10.5 Indirect Questions

10.5.1 Basic Structure

Among the verbs selecting a sentential complement, there also exist verbs requiring an indirect question:

\[(48)\]
\[
\begin{align*}
a. \text{John asks [whose book [his son likes \underline{\text{.}}]].} \\
b. \text{John asks [what [his son likes \underline{\text{.}}]].} \\
c. \text{John has forgotten [which player [his son shouted at \underline{\text{.}}]].} \\
d. \text{He told me [how many employees [Karen introduced \underline{\text{.}} to the visitors]].}
\end{align*}
\]

Notice that not all verbs allow such indirection questions as their complement:

\[(49)\]
\[
\begin{align*}
a. \text{Tom denied (that) he had been reading that article.} \\
b. *\text{Tom denied which book he had been reading.}
\end{align*}
\]
\[(50)\]
\[
\begin{align*}
a. \text{Tom claimed (that) he had spent five thousand dollars.} \\
b. *\text{Tom claimed how much money she had spent.}
\end{align*}
\]

Factive verbs like deny or claim cannot combine with an indirect question: only a finite CP can function as their complement. Verbs selecting an indirect question as their complement can be in general classified by the meaning:\textsuperscript{105}

\[(51)\]
\[
\begin{align*}
a. \text{interrogative verbs: ask, wonder, inquire} \\
b. \text{verbs of knowledge: know, learn, forget} \\
c. \text{verbs of increased knowledge: teach, tell, inform} \\
d. \text{decision verbs/verbs of concern: decide, care}
\end{align*}
\]

The complement CP of these verbs cannot be a canonical CP: it must be an indirect question:

\[(52)\]
\[
\begin{align*}
a. *\text{John inquired that he should read it.} \\
b. *\text{John forgot that the drawer contained the money.} \\
c. *\text{Peter will decide that we should review the book.}
\end{align*}
\]
\[(53)\]
\[
\begin{align*}
a. \text{John inquired which book he should read.} \\
b. \text{John forgot which drawer contained the money.} \\
c. \text{Peter will decide which book we should review.}
\end{align*}
\]

\textsuperscript{105}\text{Unlike verbs such as wonder, those like tell can select either a declarative CP or an indirect question.}
This means that we need to distinguish indirect questions from CPs headed by *that* or simple Ss. This in turn means that verbs like *inquire, forget, decide, wonder* will be different from those like *deny* in that the former’s CP complement is specified with [*QUE +*].

\[\begin{align*}
\text{a.} & \quad \left[ \langle \text{wonder} \rangle \right. \\
& \quad \text{HEAD} \mid \text{POS verb} \\
& \quad \text{SPR} \langle 1 \rangle \\
& \quad \text{COMPS} \left[ \langle \text{CP} [\text{QUE +}] \rangle \right] \\
\text{b.} & \quad \left[ \langle \text{deny} \rangle \right. \\
& \quad \text{HEAD} \mid \text{POS verb} \\
& \quad \text{SPR} \langle 1 \rangle \\
& \quad \text{COMPS} \left[ \langle \text{CP} [\text{QUE -}] \rangle \right]
\end{align*}\]

As given in the following, the indirect question needs to be marked with the feature [*QUE +*] so that the clause is distinguished from the canonical S:

\[\begin{align*}
\text{(55)} & \quad \text{VP} \\
& \quad \text{V} \\
& \quad \text{S[QUE +]} \\
& \quad \text{asks} \quad \text{NP[QUE +]} \\
& \quad \text{S[GAP } \langle \text{NP} \rangle] \\
& \quad \text{whose book} \\
& \quad \text{NP} \\
& \quad \text{his son} \\
& \quad \text{VP[GAP } \langle \text{NP} \rangle] \\
& \quad \text{likes}
\end{align*}\]

The feature *QUE* starts from the wh-word *which*. This feature, similar to the feature GAP, will pass up to the point where it is required by a verb or to the highest position to tell us the given sentence is a question:

\[\begin{align*}
\text{(56) a.} & \quad [\text{S[QUE +]} \text{ In which box did he put the book } \_ \_ ]? \\
\text{b.} & \quad [\text{S[QUE +]} \text{ Which book of his father did he read } \_ \_ ]?
\end{align*}\]

\[\begin{align*}
\text{(57) a.} & \quad \text{John asks } [\text{S[QUE +]} \text{ in which box he put the book}]. \\
\text{b.} & \quad \text{John asks } [\text{S[QUE +]} \text{ which book of his father he read}].
\end{align*}\]

The percolation of the feature *QUE* (including GAP) can be ensured by the following inheritance principle:

\[\text{(58) Nonlocal Feature Inheritance Principle (NIP): A phrase’s nonlocal feature such as GAP and QUE is the sum of its daughters’ nonlocal feature values minus the bound nonlocal features.}\]
This principled constraint allows the QUE value to pass up to the mother even from a nonhead as given in the following:

(59)  a. Kim has wondered [[in which room] Gary stayed __].
    b. Lee asked me [[how fond of chocolates] the monkeys are __]].

The structure of (59a) will look like the following:

(60)

```
 VP ←←←←←←←←←←←←
    ↑↑↑↑↑↑↑↑↑↑↑↑
    V               S[QUE +]
        PP            S[GAP ⟨PP⟩]
           ↑       ↑
      wondered  [QUE +]  staved
           ↓       ↓
         in which room NP   VP[GAP ⟨PP⟩]
                ↓       ↓
               Gary  V[GAP ⟨PP⟩]
```

The verb forgotten selects an indirection question sentence, an S with the feature [QUE +]. This system will not generate examples like the following in which such verbs combine with a [QUE −] S:

(61)  a. *Kim has wondered that Gary stayed in the room.
    b. *Kim asked me that the monkeys are very fond of chocolates.

Another important restriction here is that the missing phrase must correspond with the wh-phrase in the initial position of the indirect phrase. For example, the following structure is not licensed simply because there is no Head-Filler Rule that allows the combination of the filler NP with a PP missing S:
In a similar fashion, the present system also predicts the following contrast:

(63) a. John knows [whose book [Mary bought _ ] and [Tom borrowed _ from her]].
    b. *John knows [whose book [Mary bought _ ] and [Tom talked _ ]].

The partial structure of these can be represented as following:

(64) a. 

[Note: The diagram is not fully rendered in the text. The representation involves complex syntactic structures with gaps and complex phrase structures.]
As long as two GAP values are identical, we can unify the two into one as in (64a). However, if the GAP values are different as in (64b), there is no way to unify them into one.

### 10.5.2 Non-Wh Indirect Questions

English also generates indirect questions headed by the complementizer *whether* and *if*:

(65) a. I don’t know [whether/if I should agree].
   b. She gets upset [whether/if I exclude her from anything].
   c. I wonder [whether/if you’d be kind enough to give us information].

The inner sentence of the indirect questions here is a complete sentence with no missing element, different from indirect questions like *I wonder who John met yesterday*. This means that the complementizer *whether* or *if* will have at least the following lexical entry:

(66) \[
\begin{bmatrix}
\langle \text{whether} \rangle \\
\text{SYN} \begin{bmatrix} \\
\text{HEAD} | \text{POS comp} \\
\text{VAL} | \text{COMPS} \langle S \rangle \\
\text{QUE +} \\
\end{bmatrix}
\end{bmatrix}
\]

According to the lexical information, *whether* selects a finite S with the [QUE +] value, generating a structure like the following:

(67) \[
\begin{array}{c}
\text{CP[QUE +]} \\
\text{C[QUE +]} \\
\text{S[fin]} \\
\text{whether/if} \quad \text{I should agree}
\end{array}
\]

One thing to note here is that *if* and *whether* are slightly different\(^{106}\) even though they both carry the positive QUE feature.

\(^{106}\)See Exercise 4 of Chapter 2
Just like indirect questions, the clauses headed by *whether* can serve as an prepositional object.

(68) a. I am not certain about when he will come.  
     b. I am not certain about whether he will go or not.

However, *if* cannot function as the prepositional object:

(69) a. *I am not certain about if he will come.  
     b. *I am not certain about if he will go or not.

There is also a difference between *if* and *whether* in infinitival constructions:

(70) a. I don’t know where to go.  
     b. I don’t know what to do.  
     c. I don’t know how to do it.  
     d. I don’t know whether to agree with him or not.

(71) a. *I don’t know if to agree with him or not.  
     b. *I don’t know that to agree with him or not.

This means that *whether* and *if* can both bear the feature QUE (projecting an indirect question), but different with respect to the fact that only *whether* behaves like a *wh*-element.\(^\text{107}\)

### 10.5.3 Infinitival Indirect Questions

In addition to the finite indirect questions, English allows infinitival indirect questions:

(72) a. Fred knows [which politician to support].  
     b. Karen asked [where to put the chairs].

(73) a. Fred knows [which politician to vote for].  
     b. Karen asked [where to put the chairs].

Just like the finite indirect questions, these constructions also have bipartite structures: one *wh*-phrase and an infinitival clause with one missing element. Notice here the prohibition of having the VP’s subject:

(74) a. *Fred knows [which politician for Karen to vote for].  
     b. *Karen asked [where for Washington to put the chairs].

As observed here, in infinitival indirect questions, the subject of the infinitival VP cannot appear. Notice that in English there are several environments where the subject is unexpressed. One canonical example is imperative:

(75) a. Protect yourself!  
     b. Be honest with me!

\(^\text{107}\)One way to distinguish the *wh*-elements including *whether* from *if* is to assign the feature WH to the latter.
Such imperatives do not have an overt subject pronoun even though it is a second person subject you. Just like such a case, the infinitival VP has an understood, unexpressed subject. Traditionally, the unexpressed pronoun subject of a finite clause is called ‘small pro’ whereas that of an nonfinite clause is called ‘big PRO’. In our terms, we can assume that both of these are noncanonical realizations of pronoun and allow a VP directly to project onto an S in accordance with the Head-Only Rule:

(76) Head-Only Rule:
\[ S \rightarrow VP[SPR \langle NP[noncan-pro] \rangle] \]

The rule says a VP whose subject is a noncan-pro (noncanonical-pronoun) (including pro and PRO) can be directly mapped onto the subject. For example, this rule will then generate the following structure for (75a):

(77)  
\[
\begin{array}{c}
\text{a.} & S \\
& VP[SPR \langle NP[pro] \rangle] \\
& \quad \quad V \quad \quad NP \\
& \quad \quad \text{Protect} \quad \text{yourself} \\
\text{b.} & S \\
& VP[SPR \langle NP[PRO] \rangle] \\
& \quad \quad V \quad \quad NP \\
& \quad \quad \text{to} \quad \text{protect yourself}
\end{array}
\]

The subject of the VP is an unrealized 2nd person pronoun (pro). Thus, the VP can be directly mapped onto the S.

Now let us consider the structure for (72a):
Consider from the bottom. The verb *support* selects two arguments whose second argument is realized as a GAP:

\[
\begin{array}{c}
\langle \text{support} \rangle \\
\text{VAL} \quad \text{COMPS} \langle \rangle \\
\text{GAP} \langle \text{NP} \rangle \\
\text{ARG-ST} \langle \text{NP}, \text{NP} \rangle \\
\end{array}
\]

The verb will then form a VP with the infinitival marker to. Since this VP’s subject is PRO, the VP can be projected into an S with the GAP value. The S then forms a well-formed head-filler phrase with the filler *which politician*. The QUE value on the phrase makes the whole infinitival clause as an indirect question that can be combined with the verb *knows*. 
10.6 Exercises

1. Draw tree structures for the following and mark what kind of grammar rules (e.g., HeadSpecifier, Head-Complement, Head-Modifier, Head-Only, and Head-Filler Rule) licenses each phrasal combination. In addition, Provide a tree structure for the following sentences with the lexical entry for the italicized predicates:

(i) a. Joseph has \textit{forgotten} how many matches he has won.

b. The committee \textit{knows} whose efforts to achieve peace the world should honor.

c. Fred will \textit{warn} Martha that she should claim that her brother is patriotic.

d. That Bill tried to \textit{discover} which drawer Alice put the money in made us realize that we should have left him in Seoul.

e. Mary \textit{told} me how brave he was.

f. Jasper \textit{wonders} which book he should attempt to persuade his students to buy.

g. What proof that he has implicated have you \textit{found}? 

2. Draw tree structures for the following sentences?

(i) a. Whose car is blocking the entrance to the store?

b. Which textbook was used in his class last summer?

c. Which textbook did the teacher use in the class last summer?

d. To whom did you send your job application?

3. We have seen wh-questions and indirect questions in which only arguments are gapped. How then can the present system account for examples like the following in which \textit{wh}-phrases are not arguments but behave like an adjunct?

(i) a. How carefully have you considered your future career?

b. When can we register for graduation?

c. Where do we go to register for graduation?

d. Why have you borrowed my pencil?

Now consider the following examples:

(ii) a. Why did you say that she will invite me?

b. How long did he tell you that he waited?

c. I asked when they think that they will meet Mary.

Do these examples have more than one interpretation, depending on the scope of the \textit{wh}-elements? Compare these with the following?

(iii) a. Why do you wonder whether she will invite me?

b. How often did he ask when she will meet at the party?

Can you see the difference between examples in (ii) and those in (iii)? Also, think of how to account for these examples within the present system.
4. Analyze the following sentences in the paragraph as far as you can. Use tree structures and lexical entries.

(i) Within grammar lies the power of expression. Understand grammar, and you will understand just how amazing a language is. You uncover the magician’s tricks, you find the inner workings of not only your own language, but you can also see how it is different from the language you’re studying. You will find that different languages are better for expressing different ideas, and you will be able to make conscious decisions about how you communicate. Grammar gives you the formula, the canvas, or the blank notation sheet that you then choose which variables, paints, or notes you want to put down. Once you know how to use each part of speech, you will be able to expand outside of the box and express yourself in ways that no one has ever expressed themselves before. A solid understanding of the grammar of a language gives you the skeleton, and your words bring it to life. That is why we study grammar.\(^{108}\)

\(^{108}\)From ‘GRAMMAR (no, don’t run, I want to be your friend!)’ by Colin Suess
11

Relative Clause Constructions

11.1 Introduction

English relative clauses, basically functioning as a modifier, are also long distance dependency constructions in that the gap in the relative clause is long-distance dependent upon the relative pronoun filler:

(1) a. The video [which you recommended _ ] was really terrific.
   b. The video [which I thought you recommended _ ] was really terrific.

Relative clauses can be classified according to several criteria. We can first classify them by the type of missing elements in the relative clause:

(2) a. the student who _ won the prize
   b. the student who everyone likes _
   c. the baker from whom I bought these bagels _
   d. the person whom John gave the book to _
   e. the day when I met her _
   f. the place where we can relax _

As given here, the missing element can be subject, object, or oblique argument, prepositional object, or even temporal and place adjunct.

We also can divide relative clauses by the type of relative pronoun: wh-relatives, that-relatives, and bare relatives.\(^{109}\)

(3) a. The president [who [Fred voted for]] has resigned.
   b. The president [that Fred voted for] dislike his opponents.
   c. The president [_ Fred voted for] has resigned.

In (3c) we have no relative pronoun like who or that, but the clause Fred voted for modifies the president.

Depending on the tenseness of the relative clause, we have finite and infinitival relative clauses:

\(^{109}\)We take that as a relative pronoun too.
(4)  a. He is the kind of person [with whom to consult].
    b. There is not a whole lot [with which to disagree].
    c. We will invite volunteers [on whom to work].

In addition, examples like (5) are often called ‘reduced relative clauses’ in that these expressions seem to omit the string ‘wh-phrase + be’ as indicated in the parenthesis:

(5)  a. the person (who is) standing on my foot
    b. the prophet (which was) descended from heaven
    c. the bills (which were) passed by the House yesterday
    d. the people (who are) in Rome
    e. the people (who are) happy with the proposal

11.2  Restrictive vs. Nonrestrictive Relative Clauses

11.2.1  Basic Differences

In addition to the types of relative clause we seen before, there is a canonical distinction between restrictive and nonrestrictive. Consider the following:

(6)  a. The person who John asked for help thinks John is a foolish.
    b. Mary, who John asked for help, thinks John is a foolish.

The relative clause in (6a) semantically restricts the denotation of person whereas the one in (6b) just adds extra information about Mary. Let us consider one more pair:

(7)  a. John has two sisters who became lawyers.
    b. John has two sisters, who became lawyers.

As pointed out, the first difference between the two types of relative clauses comes from the meaning, as represented in the following diagrams. The denotation of the restrictive relative clause two sisters who became lawyers is the interaction between the set of two sisters and that of the lawyers. There can be more than two sisters, but there are only two who became lawyers. Meanwhile two sisters, who became lawyers mean that there are two sisters and they all became lawyers: there is no interaction meaning here. Thus, there exist only two sisters.

(8)  a. Meaning of the restrictive relative clause

```
  sisters
  E  F
D    A    C
  I    G    H
 lawyers
```
b. Meaning of the non-restrictive relative clause

This meaning difference explains the difference in the types of possible antecedents. For example, only the nonrestrictive relative clause can modify a proper noun:

(9)  a. Regan, whom the Republicans nominated in 1980, now lives in California.
    b. *Regan who began his career as a radio announcer came to hold the nation’s highest office.

Considering that a personal pronoun denotes one and the only one, nothing can restrict its meaning.

The meaning difference is also related to the fact that only a restrictive clause can modify indefinite pronouns such as everyone and nothing, or indefinite determiners like every and no.

(10)  a. Every student who attended the party had a good time.
      b. *Every student, who attended the party, had a good time.

(11)  a. No student who scored 80 or more in the exam was ever failed.
      b. *No student, who scored 80 or more in the exam, was ever failed.

The phrases with no, any, or every semantically have no referential interpretations. That is, if we look at (11)b, who has its antecedent no student. However, since no student has no reference, who has no referent.

The two types are also different with respect to stacking and ordering relations. For example, restrictive clauses can be stacked, but nonrestrictive clauses cannot:

(12)  a. The student who took the qualifying exam who failed it wants to retake it.
      b. *Sam Bronowsky, who took the qualifying exam, who failed it, wants to retake it.

(13)  a. I met the man that grows peaches that lives near your cousin.
      b. I don’t like the bills passed by the House yesterday that we objected to died in the Senate.
      c. Harold borrowed the book from Sally that he had been wanting to read.

In addition, the restrictive clause must precede the nonrestrictive clause:

(14)  a. The contestant who won the first prize, who is the judge’s brother-in-law, sang dreadfully.
      b. *The contestant, who is the judge’s brother-in-law, who won the first prize sang dreadfully.
11.2.2 Capturing the Differences

Let us consider some canonical restrictive relative clauses, first:

(15) a. the senators [who] Fred met _
    b. the apple [that] John ate _
    c. the problem [ _ ] you told us about _

Just like wh-questions, we can notice that relative clauses have bipartite structures: a wh-element and a sentence with one missing element:

(16) a. wh-element S/XP
    b. that S/XP
    c. [ _ ] S/XP

We can represent the structure of (15a) as following:

(17) N′
    N′
    |    S[REL +]
    |    senators [NP[REL +]] S[GAP (NP)]
    |    who NP VP[GAP (NP)]
    |     Fred V[GAP (NP)]
    |     met

Notice that the complement of the verb met is realized as a GAP value which is percolated up until it is discharged. The incomplete sentence Fred met combines with the relative pronoun who, forming a head-filler phrase. The relative pronoun has the feature [REL +], passing up to the S too. This REL feature on the sentence ensures that the whole relative clause functions as a modifier to the head senators.
As given in the structure, the verb *met* has its object as a GAP value, and the filler *who* functions as its filler. The combination of the filler *whom* and the gapped sentence *Fred met* forms a well-formed head-filler phrase that can modify a nominal element. This filler has the nonlocal REL feature that percolates up to the mother. This REL feature also observes the NIP (Nonlocal Inheritance Principle) in the sense that its value is inherited to the mother phrase from a non-head as illustrated in the following:\(^\text{110}\)

\[
\begin{align*}
\text{(19)} & \quad \begin{align*}
\text{a.} & \quad \text{The teacher set us a problem [the answer to which] we can find in the textbook.} \\
\text{b.} & \quad \text{We just finished the final exam [the result of which] we can find next week.} \\
\text{c.} & \quad \text{I just met the friend [in whose apartment] I would be staying.}
\end{align*}
\end{align*}
\]

The REL value here is originated from a non-head and percolated up to the relative clause.

One thing to notice in the structure (19) is that the restrictive relative clause modifies not a fully saturated NP but an \(N'\). As seen from the following contrast, we can notice that the restrictive relative clause cannot modify a pronoun or proper noun:\(^\text{111}\)

\[
\begin{align*}
\text{(20)} & \quad \begin{align*}
\text{a.} & \quad \text{the man that grows peaches} \\
\text{b.} & \quad \text{the king of England that grows peaches}
\end{align*}
\end{align*}
\]

\[
\begin{align*}
\text{(21)} & \quad \begin{align*}
\text{a.} & \quad \text{*John that grows peaches} \\
\text{b.} & \quad \text{*him that grows peaches}
\end{align*}
\end{align*}
\]

\(^{110}\)Even though GAP, QUE, and REL are all nonlocal features, their values are different. The value of the feature GAP is a list, that of the QUE is boolean, and that of the REL is an index.

\(^{111}\)In Archaic form of English, *who* relative clause can modify the pronoun *he*:

\[
\begin{align*}
\text{(i) a.} & \quad \text{He who laughs last laughs best.} \\
\text{b.} & \quad \text{He who is without sin among you, let him first cast a stone at her.}
\end{align*}
\]
Such data have support the idea that the relative clause modifies not a full NP but a smaller expression like N′ as represented in the following:

(22) Restrictive Relative Clause:

As mentioned earlier, unlike restrictive relative clauses, nonrestrictive relative clauses like (23) can modify a proper noun or a pronoun:

(23) In the classroom, the teacher praised John, whom I also respect.

The relative clause whom I also respect modifies the proper noun John in a nonrestrictive way: the clause just adds extra information about John. This implies that the nonrestrictive relative clause has a structure like the following:

(24) Non-restrictive Relative Clause:

If the these restrictive and non-restrictive types of relative clauses are structurally different, how do they diff in terms of syntax and semantics? Let’s compare the following two sentences:

These differences can be predicted from the structural differences: the restrictive relative clause modifies an N′ whereas the nonrestrictive relative clause modifies NP. For example, consider the structure of (24a) first:
Since the combination of the restrictive relative clause who won the first prize and the head contestant forms an N' which in turn forms an NP with its specifier the. Note that the nonrestrictive clause who is the judge’s... can easily modify this final NP. However, when the nonrestrictive relative clause precedes the restrictive one, we will get a wrong structure:

As given in the structure, when the nonrestrictive relative clause who is the judge’s... modifies the full NP the contestant, the result will be a fully saturated NP. This in turn means that the restrictive relative clause, requiring to modify an N' not an NP, thus cannot modify the output NP.\footnote{One more difference between restrictive and nonrestrictive is that that is used only in restrictive.}

11.2.3 Types of Postnominal Modifiers

In English, various phrasal types can serve as a postmodifier. For example, as noted earlier as reduced relative clauses, the AP, PP, infinitival VP, or S can be a modifier to the preceding noun:

(i) a. The knife [which/that] he stabbed John with had a gold handle.
    b. *The knife, [that] he stabbed John had a gold handle.
(27)  
  a. the people [happy with the proposal]  
  b. the people [in Rome]  
  c. the person [standing on my foot]  
  d. the bills [passed by the House yesterday]  
  e. the paper [to finish by tomorrow]  
  f. the person [to finish the project by tomorrow]

However, not all phrases can function as a postmodifier:

(28)  
  a. *the person [stand on my foot]  
  b. *the person [stood on my foot]  
  c. *the person [stands on my foot]

A base VP or finite VP cannot function as a postnominal modifier.

As for clauses, we can easily notice that a complete sentence cannot function as a postnominal modifier:

(29)  
  a. *the senator [that John met Bill]  
  b. *the senator [if John met Bill]  
  c. *the senator [for John to meet Bill]

Only a relative clause can function as a postnominal modifier. That is, an S[REL+] or an S with a missing element can serve as a modifier:

(30)  
  a. the senator [[whom/that] [John met _ ]]  
  b. the senator [[whom/that] [we believe John met _ ]]  

We can assume that these expressions carry the head feature [MOD <N’>]. The assignment of this MOD feature to these expressions can be lexical or constructional. For example, the attributive preposition or adjective will lexically have the following information:

(31) \[
\left\{
\begin{array}{l}
\text{AP} \\
\text{PP} \\
\text{nonfinite VP} \\
\text{S[REL+]} \\
\end{array}
\right\} \Rightarrow \left[\text{HEAD} \mid \text{MOD } \langle N' \rangle \right]
\]

The head feature MOD will pass up the AP or PP or nonfinite VP, enabling them to modify the prenominal position. The MOD value on the S[REL+] can be added by a constructional constraint.\footnote{This MOD value can be added by a morphological element in the verb of the relative clause, as in languages like Korean. See Kim (2002).}
As noted here, the [REL +] feature passed up on the S triggers the relative clause *whom Fred met* to function as a modifier to the N’ expression. However, the nonfinite VP like *standing on my foot* introduces the MOD feature from the head *standing* as seen from the following structure:

11.3 Subject Relative Clauses

Subject relative clauses behave like non-subject relatives clauses we have seen so far. However, one main difference is that the presence of a wh-relative pronoun including *that* is obligatory:

(34)  a. the senators [who] met Fred
b. the apple [that] fell down on the ground

Notice here that English does not allow a finite VP to function as the postnominal modifier:

(35)  a. *[The student [met John]] came.
b. *[The problem [intrigued us]] bothered me.]

As we have seen in the previous chapter, English does not allow the subject to be gapped, either. As in subject wh-questions, subject relative clauses are generated when the subject of a matrix verb is realized as a [REL +] expression. For example, the subject of meet can be realized as a [REL +] expression:

(36)  \[
\begin{array}{c}
\langle \text{meet} \rangle \\
\text{SPR} \langle \text{[REL +]} \rangle \\
\text{COMPS} \langle \text{NP} \rangle
\end{array}
\]

This lexical entry will then be able to project a structure like the following:

(37)  \[
\begin{array}{c}
N' \\
\text{\[REL +\]} \\
\text{SPR} \langle \text{[REL +]} \rangle \\
\text{COMPS} \langle \text{NP} \rangle
\end{array}
\]

The VP met Fred combines with the subject relative pronoun who which carries the [REL +] feature. The resulting S will still carry the REL feature, introducing the MOD feature. The S[REL +] then modifies the head senators by the Head-Modifier Rule.

11.4 That-relative clauses

As noted earlier, that can be used as a relative pronoun.\textsuperscript{114}

\textsuperscript{114}Not all the analyses take that as a relative pronoun. One can develop an analysis in which that is taken to be a complementizer.
A complexity arises when *that* is used as a complementizer as in (39):

(39)  
\[
\begin{align*}
\text{a. } & \text{Mary knows that John was elected.} \\
\text{b. } & \text{That John was elected surprised Frank.} \\
\text{c. } & \text{It surprised Frank that John was elected.} \\
\text{d. } & \text{The fact that John was elected surprised Frank.} \\
\text{e. } & \text{Mary told Bill that John was elected.}
\end{align*}
\]

How can we distinguish between the two usages of *that*? One clear difference is that the relative pronoun *that* requires its following clause be a sentence with one missing element whereas the complementizer *that* combines with a complete S, as represented in the following:

(40)  
\[
\begin{align*}
\text{a. } & \text{CP} \\
\text{b. } & \text{S[REL +]}
\end{align*}
\]

\[
\begin{align*}
\text{Comp} & \longrightarrow S \\
\text{that} & \longrightarrow \ldots
\end{align*}
\]

\[
\begin{align*}
\text{NP[REL +]} & \longrightarrow S[\text{GAP} \langle \text{NP} \rangle] \\
\text{that} & \longrightarrow \ldots
\end{align*}
\]

To see a clear difference between complementizer *that* and relative pronoun *that*, let us consider some examples:

(41)  
\[
\begin{align*}
\text{a. } & \text{Mary told us } \left\{ \begin{array}{l}
\text{Mary met the man} \\
\text{that John disappeared}. \\
\end{array} \right. \\
\text{b. } & \text{*Mary told us } \left\{ \begin{array}{l}
\text{Mary met the man} \\
\text{that disappeared}. \\
\end{array} \right.
\end{align*}
\]

The clause *John disappeared* in (41a) is a complete clause whereas *disappeared* in (41b) is just a VP clause still requiring a subject. This in turn means *that John disappeared* in (41a) is a CP clause headed by the complementizer *that* whereas *that disappeared* in (41b) is a relative clause with the relative pronoun *that*. A further contrast can be observed from the following too:

(42)  
\[
\begin{align*}
\text{a. } & \text{Mary told us } \left\{ \begin{array}{l}
\text{Mary met the man} \\
\text{that we will speak with John}. \\
\end{array} \right. \\
\text{b. } & \text{*Mary told us } \left\{ \begin{array}{l}
\text{Mary met the man} \\
\text{that we will speak with}. \\
\end{array} \right.
\end{align*}
\]

The verb *told* selects for an NP and a complete sentence as its complements whereas *met* just for a simple NP. In (42a), the clause *we will speak with John* is a complete sentence and *that* can be only a complementizer; the clause thus can function as the sentential complement of
told, but it is not required for met. Meanwhile, in (42b) that can be either a relativizer or a complementizer. In either case, this cannot occur with told requiring an NP and a complete sentence as its complements. However, as for met, when that is a relativizer, we have a well-formed structure like the following:

(43)

\[
\begin{array}{c}
\text{men} \\
\text{that} \\
\text{we will speak with}
\end{array}
\]

\[
\begin{array}{c}
\text{S} \\
\text{NP[REL +]} \\
\text{GAP (2i)}
\end{array}
\]

\[
\begin{array}{c}
\text{N'} \\
\text{3N'} \\
\text{S[MOD (3N')]} \\
\text{REL +}
\end{array}
\]

11.5 Infinitival and Bare Relative Clauses

Notice that an infinitival clause can also function as a modifier to the preceding relative clause. Infinitival relative clauses can have either a relative pronoun or not:

(44) a. a bench on which to sit
    b. a refrigerator in which to put the beer

(45) a. a book (for you) to give to Alice
    b. a bench (for you) to sit on

Let’s consider infinitival wh-relatives first. As we have seen in the previous chapter, an infinitival VP can be projected into an S when its subject is realized as a PRO. This will then allow the following structure for (44a):
As given here, the VP to sit modifies an $N'$ phrase. This infinitival VP, missing its PP complement, realizes its SPR as a PRO, thus projected into an $S$ in accordance with the Head-Only Rule. This $S$ forms a head-filler phrase with the filler PP on which. The resulting $S$ carries the feature MOD due to the REL feature inherited from which. Once again, we observe that every projection observes the grammar rules as well as other general principles such as the HFP and the VALP.

Infinitival wh-relatives have an additional constraint on the realization of the subject.

\[(47)\]
\[
\begin{array}{l}
\text{a. } *\text{a bench on which [for Jerry] to sit}_- \\
\text{b. } *\text{a refrigerator in which [for you] to put the beer}_-
\end{array}
\]

As seen here, the wh-infinitival relatives cannot have the subject (for Jerry) realized. We have seen that the same applies with an infinitival wh-questions, whose data repeated here:

\[(48)\]
\[
\begin{array}{l}
\text{a. } *\text{Fred knows [which politician [for Karen] to vote for].} \\
\text{b. } *\text{Karen asked [where [for Washington] to put the chairs].}
\end{array}
\]

This in turn means that both infinitival wh-relatives and infinitival wh-questions induces the same constraint. The reason for the ungrammaticality of examples like (47a) can be understood if we look at its structure:
The S here is an ill-formed: There is no rule that allows the combination of a CP/PP with a PP to form a head-filler phrase, as seen from the Head-Filler Rule repeated here.

\[
\begin{align*}
(50) \quad & \text{Head-Filler Rule:} \\
& S \left[ \text{GAP} \langle \phantom{\text{head}} \rangle \right] \rightarrow \text{S} \left[ \text{GAP} \langle \text{head} \rangle \right]
\end{align*}
\]

As we can see here, the head of the TOP S is not a CP but an S. In (49), the head is not an S but a CP headed for \textit{for}. This explains the constraint on not allowing the subject in infinitival relative clauses.

How then can we deal with an infinitival bare relative clause? As we have seen, a limited set of phrases or clauses can function as a postnominal modifier. In terms of an infinitival VP or CP, there is no restriction with respect to the presence of a GAP:

\[
(51) \quad \begin{align*}
& a. \quad \text{the paper [for us to read \_ by tomorrow]} \\
& b. \quad \text{the paper [to finish \_ by tomorrow]}
\end{align*}
\]

Notice here that unlike infinitival wh-relative clauses, (51a) has the subject of the VP. Since the infinitival CP can function as a modifier, nothing is wrong to have the subject here. The infinitival VP in (51b) can also function as a modifier to the prenominal element, as represented in the following:
As given here, the VP clause *to sit on* will have the MOD feature together with one GAP element. The issue here is how to deal with the GAP value here since there is no filler for the GAP value. One thing we can notice here is that English allows an incomplete S allows to function as a postnominal modifier.

(53) a. the person [I met _].
    b. the box [we put the books in _].

What this means is that English allows an S with missing an accusative NP can also function as a postnominal modifier with discharging the GAP value as the result:

(54) Head-REL Phrase Rule:

\[\text{NP} \rightarrow \text{Det N'} \quad \text{VP} \rightarrow \text{S [MOD} \quad \text{GAP} \quad \text{]} \]

This rule means the English relative phrase is the combination of a N' with a postnominal S which can have either no GAP value or a GAP value whose case is accusative and index value is identical with the head N'. This rule then will allow us to expect the possibility of omitting the accusative relative pronoun in examples like (53).

There exists also one interesting constraint in wh-infinitival relative clauses:

(55) a. *a person whom to give the book to _
    b. *a bench which to sit on _

(56) a. a person to whom to give the book _
    b. a bench on which to sit _
As noted from (55), the wh-infinitival relative clause does not allow the GAP to be an NP: it must be a PP. Even though there is no clear reason why the GAP must be PP, we can conjecture this reason if we consider the role of the relative pronoun NP here. As discussed earlier, an infinitival VP to give the book to (projected into an S) already has the information that it can modify a prenominal element. This means that if the relative pronoun whom here is only to indicate that the infinitival VP is a modifier, this then will be redundant.

11.6 Island Constraints

In the wh-interrogatives and relative clauses, the filler and the gap can be long-distance, that is, unbounded. Yet, there exist constructions where this dependency relationship needs to be bounded. Consider the following:

(57)  a. [Who] did he claim [that he has met _ ]?
    b. [Which celebrity] did he mention [that he had run into _ ]?

(58)  a. *[Who] did he claim [the fact that he has met _ ]?
    b. *[Which celebrity] did he mention [the fact that he had run into _ ]+

Why do we have the contrast here? Let us see the partial structures of (57a) and (58a):

(59)  a. VP[GAP ⟨NP⟩]

        V

        CP[GAP ⟨NP⟩]

  claim     C     S[GAP ⟨NP⟩]

  that     he has met

b. VP[GAP ⟨NP⟩]

        V

        *NP[GAP ⟨NP⟩]

  claim  Det  N′[GAP ⟨NP⟩]

  the   N   CP[GAP ⟨NP⟩]

  fact     that he has met _

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What is the main difference here? There is nothing wrong for a CP to have a GAP value as in (59a), but the complex NP in (59b) cannot have a GAP value. This kind of complex NP is traditionally called an ‘island’ in the sense that it is effectively isolated from the rest of the sentence it is in. That is, an element within this island cannot be extracted out or linked to an expression outside. It has been traditionally assumed that English has other island constraints as given in the following:¹¹⁵

- Coordinate Structure Constraint (CSC): In a coordinate structure, no element in one conjunct can be wh-questioned or relativized.
  
  (60)  
  a. Bill cooked supper and washed the dishes.  
  b.*What did Bill cook ___ and wash the dishes?  
  c.*What did Bill cook supper and wash ___ ?

- Complex Noun Phrase Constraint (CNPC): No element in an S dominated by an NP can be wh-questioned or relativized.
  
  (61)  
  a. He refuted the proof that you can’t square it.  
  b.*What did he refute the proof that you can’t square ___ ?  
  (62)  
  a. They met someone [who knows the professor].  
  b.*[Which professor] did they meet someone who knows ___ ?

- Sentential Subject Constraint (SSC): The element within the clausal subject cannot be wh-questioned or relativized.
  
  (63)  
  a. [That he has met the professor] is extremely unlikely.  
  b.*Who is [that he has met ___ ] extremely unlikely?

- Left-Branching Constraint (LBC): No NP that is the leftmost constituent of a larger NP can be wh-questioned or relativized:
  
  (64)  
  a. She bought [John’s] book.  
  b.*Whose did she buy ___ book?

- Adjunct Clause Constraint (ACC): An element within an adjunct cannot be questioned or relativized.
  
  (65)  
  a. Which topic did you choose ___ without getting his approval?  
  b.*Which topic did you choose it [because Mary talked about ___ ]?

- Indirect Wh-question Constraint (IWC): An NP that is part of an indirect question cannot be questioned or relativized.
  
  (66)  
  a. Did John wonder who would win the game?  
  b.*What did John wonder who would win ___ ?

Various attempts have been made to account for such island constraints. Among these, we sketch an analysis within the present system that relies on licensing constraints on subtree structures.

¹¹⁵There exist examples that appear not to observe such island constraints.
As for the CSC (Coordinate Structure Constraint), the analysis presented here requires no additional mechanism. Consider the Coordination Rule, repeated here:

\[(67)\] Coordination Rule:

\[XP \rightarrow XP[\text{GAP} \[\text{A}\]] \text{ conj } XP[\text{GAP} \[\text{A}\]]\]

This rule basically allows the two identical phrases (even having the identical GAP value) to be conjoined by a conjunction and then assigns the following structure to (60b):

\[(68)\]

```
*VP
   VP[ GAP ⟨NP⟩ ] Conj VP[ GAP ⟨⟩ ]
     V[GAP ⟨NP⟩] and V NP
       cook wash the dishes
```

If we allow the coordinate of two identical categories in such a case, we cannot coordinate the two VPs, simply because they have different GAP values.

As for the CNPC (Complex Noun Phrase Constraint), first consider the structure of (61b):

\[(69)\]

```
VP
   *NP
     [HEAD | POS noun]
       SPR ⟨ ⟩
         COMPS ⟨ ⟩
           GAP ⟨NP⟩
             VNP
               refute Det N[GAP ⟨NP⟩]
                 the CP[GAP ⟨NP⟩]
                   proof that you can’t square
```
We can observe that the saturated NP cannot have a GAP value. Given that the NP structure allows the GAP value to be empty, we would then be able to predict the constraint:\footnote{This constraint is a soft constraint which can be overridden.}

\begin{center}
\begin{verbatim}
(70) Condition on the saturated NP:
\[
\begin{array}{c}
\text{HEAD} | \text{POS} \text{ noun} \\
\text{SPR} ( ) \\
\text{COMPS} ( ) \\
\end{array}
\Rightarrow \begin{array}{c}
\text{GAP} ( ) \\
\end{array}
\end{verbatim}
\end{center}

This licensing condition means that an expression whose POS value is \textit{noun} and whose SPR and COMPS value are discharged must have no GAP value.

In a similar manner, the SSC (sentential subject constraint) can be interpreted as a constraint on the Head-Specifier Rule:

\begin{center}
\begin{verbatim}
(71) Head-Specifier Rule:
\[
\text{XP} \rightarrow \{\text{GAP} ( )\}, \text{H[SPR} (\text{I})]\]
\end{verbatim}
\end{center}

This constraint means that the specifier of a head must have an empty GAP value. This assigns the following structure to the unacceptable sentence (63b):

\begin{center}
\begin{verbatim}
(72) S
  \downarrow
\begin{array}{c}
\text{SPR} ( ) \\
\text{COMPS} ( ) \\
\text{GAP} (2) \\
\end{array}
\end{verbatim}
\end{center}

Notice that this constraint can also account for the Left-Branching Constraint (LBC):

\begin{center}
\begin{verbatim}
(73) a. You saw the president’s guard.
    b. *Whose did you see _ guard?
\end{verbatim}
\end{center}
In (73b), the specifier of the head *guard* is gapped, violating the licensing rule in (71).

The AC (Adjunct Constraint) is predicted since only an argument can be gapped. However, notice that the following famous parasitic gap examples allow a gap in the adjunct when the head has the identical gap:

(74)  a. Which book did she review _ without reading it?
  b. *Which book did she review it without reading _ ?
  c. Which book did she review _ without reading _?

As seen in (74b), an element in the *without* adjunct clause cannot be wh-questioned. However, as in (74c), this gap in the modifier clause can be licensed when the head VP that the clause modifies has the identical gap. The second gap in the adjunct clause is thus considered to be ‘parasitic’ since this second gap (unlike the first gap) cannot easily stand on its own. The one simple way of implementing this constraint is to treat the GAP as a HEAD feature as well.\(^{117}\) This means when the modifier has a GAP value, the head it modifies will also must have the identical feature GAP value. This is due to the GAP value is a HEAD feature. This in turn means whenever a modifier has a GAP, its head will also have the identical GAP value, enforcing a modifier cannot have a GAP value by itself. This explains the difference between the following two tree structures:

(75)  a. *VP
   
   "VP "[GAP (NP)]
   "without reading _"
   "review it"

   "[GAP (NP)]
   "review _"

   b. VP
   "[GAP (NP)]
   "without reading _"

   "[GAP (NP)]
   "review _"

In (75a), the modifier clause *without reading* has a GAP value. This means the head this clause modifies also will have the GAP value. But this is not the case here. Meanwhile, this condition

\(^{117}\)Treating the GAP feature as a nonlocal head feature is originated from Gazdar et al. (1982).
is met in (75b).

The Wh-Constraint is basically imposed on the indirect question which has the [QUE +] value. Even though we can find a further generalization (as a constraint on question sentences), we can assume that this kind of constraint is given to the lexical properties of the verb that selects an indirect question as given in (76):

\[
\text{(76) } \text{indirect-que-verb} \rightarrow \begin{bmatrix}
\text{HEAD} | \text{POS verb} \\
\text{COMPS} \langle S \left[ \text{QUE + GAP } \langle \rangle \right] \rangle
\end{bmatrix}
\]

This means that a verb selecting an indirect question as its complement requires its sentential complement to have an empty GAP value. This is why the following structure is ill-formed:

\[
\begin{array}{c}
\ast \text{VP} \\
\text{V} \\
\text{S} \\
\text{COMPS} \langle S \left[ \text{QUE + GAP } \langle \rangle \right] \rangle \\
\text{wonder} \\
\text{who would win }_\rangle
\end{array}
\]

In sum, the licensing constraints given here for the account of island constraints in English are of course neither complete nor satisfactory in covering all the relevant data. However, the analysis sketched here can give us an idea of dealing with island phenomena by adding constraints on the grammar rules or placing specific constraints on expressions.
11.7 Exercises

1. Find out a grammatical error in each of the following sentences and then explain why it is.
   
   (i) a. Students enter high-level educational institutions might face many problems relating to study habits.
   b. A fellow student saw this felt sorry for Miss Kim and offered her his own book.
   c. Experts all agree that dreams cause great anxiety and stress are called nightmares.
   d. The victims of the earthquake their property was destroyed in the disaster were given temporary housing by the government.

2. Draw tree structures for the following and see what kind of grammar rules allow the combination of each phrase.
   
   (i) a. This is the book I need to read.
   b. This is the very book we need to talk about.
   c. The official to whom Smith loaned the money has been indicted.
   d. The man on whose lap the puppet is sitting is ventriloquist.
   e. Can you think of those things which she might need?
   f. The person that they intended to speak with agreed to reimburse us.
   g. The motor that Martha thinks that Joe replaced costs thirty dollars.
   h. The children that I saw next door was not afraid of coyotes.

3. Compare the following pairs of sentences with tree structures. In particular, see if each contains a relative clause or a CP complement.
   
   (i) a. The fact that scientists proved how the universe is formed is not tenable anymore.
   b. The fact that the scientists supported with evidence caused an uproar.
   (ii) a. They ignored the suggestion that Lee made.
   b. They ignored the suggestion that Lee lied.
   (iii) a. Focus on the question which the teacher raised.
   b. Focus on the question which of them stood to gain by it.
   (iv) a. They denied the claim that we had advanced.
   b. They denied the claim that they reported to us.

4. English allows adverbial relative clause sentences like the following. Can the present analysis explain such sentences? If it can, how? If it cannot, can you think of any possible way of explaining these?
   
   (i) a. The hotel where Gloria stays is being remodelled.
   b. The day when Jim got fired was a great day for Christianity.
   c. That is the reason why he resigned.
5. Draw the tree structure for the following ungrammatical sentences and provide what kind of island constraints is violated.

   (i) a. *Who did they wonder what she gave to?
       b. *What was that the Vikings ate a real surprise to you?
       c. *Who did they disbelieve the claim that he fired?
       d. *What did you meet someone who understands?
       e. *Who did you like and John?
       f. *Which topic did you leave because Mary talked about?
       g. *The medal that John wondered who would win was the gold medal.

6. Consider the following set of sentences all of which have the same expression *what Mary offered to him* Try to explain if the expression functions as an indirect question or an NP.

   (i) a. Tom ate [what Mary offered to him].
       b. I wonder [what Mary offered to him].
       c. [What Mary offered to him] is unclear.

7. Even though the following examples have no passive verb, they have meanings similar to passive:

   (i) a. The picture needs restoring.
       b. Your jacket wants cleaning.
       c. This computer needs mending.

   Draw trees for these sentences and discuss the lexical entries for the main verb as well as the gerundive verb.

   (i) a. This needs mending.
       b. *This needs mending the shoe.
       c. He mended the shoe.
       d. *He mended.

   (ii) a. This needs investigating.
       b. *This needs investigating the problem.
       c. *They investigated.
       d. They investigated the problem.
Special Constructions

12.1 Introduction

English also displays so called ‘tough’, ‘extraposition’, and ‘cleft’ constructions:

(1) a. John is tough to persuade. (Tough)
   b. It bothers me that John snores. (Subject Extraposition)
   c. John made it clear that he would finish it on time (Object Extraposition)
   d. It is John that I met last night in the park. (Cleft)

These are different from wh-constructions or relative clause constructions in several respects. In these constructions, the gap matches with the filler in terms of the syntactic category:

(2) a. I wonder [whom [Sandy loves _]]. (Wh-question)
   b. This is the politician [on whom [Sandy relies _]]. (Wh-relative clause)

In addition, the fillers whom and on whom here are not in the argument position but in the non-argument position.\(^{118}\)

Now compare these properties with the so-called ‘tough’ constructions:

(3) a. He is hard to love _.
   b. This car is easy to drive _

We first can notice that unlike wh-questions, the putative filler in (3) is in the argument position, the subject. In addition, notice here that the putative gap in (3a) is him whereas the presumed filler is the subject he: the two have different case values (nominative and accusative, respectively). This means, the filler and the gap are not exactly identical in terms of the syntactic information. They are linked together just by referring to the same individual. In this sense, the dependency between the filler and the gap is weaker than the one in wh-questions or wh-relatives.\(^{119}\)

\(^{118}\)The argument position is often called A-positions to which a semantic (or theta) role can be assigned (subject and object positions). Meanwhile, the non-argument position is called A’-position to which no theta role is assigned. See Chomsky (1981) and (1986).

\(^{119}\)To reflect this difference, Pollard and Sag (1997) call tough examples ‘weak dependency’ constructions and wh-question examples ‘strong dependency’ constructions.
Extraposition and cleft constructions in (1b–d) are also different from wh-questions. The main difference is that both introduce the expletive *it* in the subject position. Further they have discourse effects that we will discuss in due course.\(^{120}\)

This chapter looks into the main properties of these three main constructions and provides a lexicalist view of analyzing them.

### 12.2 Tough Constructions

#### 12.2.1 Tough Predicates

First consider the following contrast:

\[(4)\]
\[
a. \text{Kim is easy to please.} \\
b. \text{Kim is eager to please.}
\]

One obvious difference of these two sentences come from the interpretation of *Kim*: in (4a), *Kim* is the object of *please* whereas *Kim* in (4b) is the subject of *eager*. That is, the verb *please* in (4a) is a transitive verb whose object is semantically linked to the subject *Kim*. Meanwhile, the verb *please* in (4b) functions as an intransitive, not requiring an object. This difference induces the following contrast:

\[(5)\]
\[
a. *\text{Kim is easy [to please Tom].} \\
b. \text{Kim is eager [to please Tom].}
\]

The VP complement of the adjective *easy* cannot have its object whereas *eager* has no such a restriction.

There exist other adjectives that behave like *easy*:

\[(6)\]
\[
a. \text{This doll is hard [to see _].} \\
b. \text{The child is too naught [to teach _].} \\
c. \text{The problem is tough [to solve _].}
\]

\[(7)\]
\[
a. *\text{This doll is [hard to see it].} \\
b. *\text{The child is too naught [to teach him].} \\
c. *\text{The problem is difficult [to solve the question].}
\]

As observed here, in all these examples, there must be a gap in the VP complement, leading to the following descriptive generalization:

\[(8)\] Adjectives like *easy* select an infinitival VP complement which has one missing element.

Meanwhile, *eager* places no such a restriction on its VP complement: its VP complement is a complete one:

\(^{120}\)Sentences like the following are also weak dependency constructions:

\[(i)\]
\[
a. \text{I bought it for Sandy to eat _}, \\
b. \text{This is the politician Sandy loves.}
\]

Such purpose infinitival clauses and relative clauses also have no overt filler in a non-argument position.
(9)  a. John is eager [to examine the patient].
    b. John is eager [to help students].

(10) a. *John is eager [to examine _].
    b. *John is eager [to help _].

The data here indicate that unlike easy, the adjective eager selects a complete infinitival VP.

12.2.2 A Lexicalist Analysis

We can represent this difference between easy-type and eager-type adjectives in the lexical information:

(11) a. easy-type adjectives
    [HEAD | POS adj
     SPR ⟨NP₁⟩
     VAL COMPS ⟨VFORM inf⟩
     GAP ⟨NP₁⟩
     TO-BIND | GAP ⟨⟩]

b. eager-type adjectives
    [HEAD | POS adj
     SPR ⟨NP⟩
     VAL COMPS ⟨VP [VFORM inf]⟩]

The lexical entry in (11a) specifies that the infinitival complement (VP or S) of easy contains a GAP value which is coindexed with the subject. Meanwhile, that of eager in (11b) is just a complete infinitival VP with no missing element. These lexical differences will assign the following structures to (4a) and (4b), respectively:
As noted in (12a), the VP complement of *easy* has a GAP value. Notice that the lexical entry *easy* in (11a) also specifies that the VP’s GAP value is identical with its own TO-BIND|GAP (B-GAP) value. This ensures that the VP’s GAP value is lexically discharged. Meanwhile, the VP complement of *eager* is already saturated.

The present analysis then also licenses sentences like the following in which the subject of the infinitival VP complement appears:

(13) a. Kim is easy for us to please.

b. Kim is easy for us to make Lee accept.
In both cases, *easy* combines with an infinitival CP with one GAP value.

The present analysis then can also predict examples in which the VP complement includes more than one GAP element. Compare the following pair of sentences:

(14)  
   a. This sonata is easy to play on _ with the piano.  
   b. Which piano is this sonata easy to play on _ with _ ?

The present analysis assigns the following structure to (14a):

As given in (11a), the adjective *easy* selects a VP complement with one GAP value coindexed with its subject. Its lexical information ensures this GAP value to be discharged. In the structure, thus, the GAP value started from the object position of *on* is percolated up to the VP where it is lexically bound by the feature B-GAP (TO-BIND|GAP) of *easy*.

Now consider the structure of (14b) in which the object of *on* is linked to the subject *this sonata* and the object of *with* is wh-questioned:
In the structure above, the VP complement of *easy* has two GAP values: one is the object ([4]) of *on* and the other is the object ([2]) of *with*. The first GAP value is lexically bound by *easy*. The remaining GAP value [2] is passed up to the place where it is discharged by its filler, *which piano* and in accordance with the Head-Filler Rule.

12.3 Extraposition

12.3.1 Basic Properties

English employs an extraposition process that places a heavy constituent such as a *that*-clause, *wh*-clause, or infinitival clause at the end of the sentence:

(17) That **dogs bark** annoys people.
   a. It annoys people [that dogs bark].
   b. It is unclear [why she told him].

(18) a. [Why she told him] is unclear.
   b. It is unclear [why she told him].

(19) a. [For you to leave so soon] would be inconvenience.
   b. It would be inconvenience [for you to leave so soon].

(20) a. [To resist] would be pointless.
   b. It would be pointless [to resist].

This kind of alternation is quite systematic: given sentences like (21a), English speakers can easily turn it into (21b):

(21) a. That Dalai Lama claims Tibet independence discomfits the Chinese government.
   b. It discomfits the Chinese government that Dalai Lama claims Tibet independence.
The extraposition process can also be applicable to an object element:

(22)  a. I believe the problem to be obvious.
    b. *I believe [that the problem is not easy] to be obvious.
    c. I believe it to be obvious [that the problem is not easy].

As noted in (22b), when the object followed by an infinitival VP complement is a clausal element, it must be extraposed to the sentential final position. Object extraposition is also similar: a finite CP or an infinitival VP, a simple S, and a gerundive phrase can be extraposed.

(23)  a. He found it frustrating [that his policies made little impact on poverty].
    b. I do not think it unreasonable of me [to ask for the return of my subscription].
    c. He made it clear [he would continue to co-operate with the United Nations].
    d. They’re not finding it a stress [being in the same office].

12.3.2 Transformational Analysis

In terms of movement operations, there have been two approaches trying to capture the systematic relationships in extraposition. One approach is to assume that the surface structure of a subject extraposition like (24b) is generated from a deep structure like (24a):

(24)  a. \[NP [NP [NP [it] S [you came early]]]] surprised me.
    b. It surprised me that you came early.

The extraposition rule moves the sentence \(you\ came\ early\) in (24a) to the sentential final position (adjoins to S) as represented in the following:

(25)

\[
\begin{array}{c}
\text{S} \\
\text{NP} \\
\text{It [t]:} \quad \text{NP} \\
\text{VP} \\
\text{V} \\
\text{NP} \\
\text{you came early} \\
\end{array}
\]

This movement process also introduces the insertion of \(that\). To generate nonextraposed sentences like \(That\ you\ came\ early\ surprised\ me\), the system posits a process of deleting \(it\) in (24a) and then adding the complementizer \(that\).
A slightly different analysis has also been suggested with the difference in the direction of movement. That is, instead of extraposing the clause from the subject, we might assume that the clause is already in the extraposed position as in (26a):

\[
(26) \quad \begin{align*}
\text{a. } & [[V_P[\text{surprised } [\text{me } S[\text{that you came } \text{early}]]].] \\
\text{b. } & [[\text{It } V_P[\text{surprised me that you came early}]].]
\end{align*}
\]

As given in (26a), the extraposed S is base-generated within the VP. When we insert the expletive it in the subject position here, we generate (26b). When this clause is moved to the subject, we would have the nonextraposed sentence *That you came early surprised me*.

Most current movement approaches follow this second line of assumption. Though such derivational analyses can capture certain aspects of English subject extraposition, they are not enough to predict lexical idiosyncrasies as well as non-local properties of extraposition.121

### 12.3.3 A Lexicalist Analysis

One obvious constraint in subject extraposition we can observe is that even though there exist systematic relationships between extraposed and nonextraposed pairs, we also find examples with no non-extraposed counterparts:

\[
(27) \quad \begin{align*}
\text{a. } & [*[\text{That Pat is innocent}] \text{ proves}.] \\
\text{b. } & \text{It proves that Pat is innocent}.)
\end{align*}
\]

\[
(28) \quad \begin{align*}
\text{a. } & *[\text{That Sandy had lied}] \text{ suggested}.] \\
\text{b. } & \text{It suggested that Sandy had lied}.)
\end{align*}
\]

As observed here, verbs like *appear, happen, chance, intend*, and *fall* do not allow non-extraposed counterparts. This kind of lexical idiosyncracy implies that subject extraposition is lexically controlled. As a way of formally representing the systematic relationship depending on the lexical property of verbs, we can introduce the following lexical rule with the feature EXTRA:

\[
(29) \quad \begin{align*}
\text{Extraposition Lexical Rule:} \\
\left[\text{ARG-ST } \langle...,\text{IND prop},...\rangle\right] \Rightarrow \left[\text{ARG-ST } \langle...,\text{NP[NFORM it]},...\rangle\text{ EXTRA } \langle\Pi\rangle\right]
\end{align*}
\]

What this rule means is that if a verbal element (adjective or verb) selects a clausal argument (whose meaning is a proposition *prop*) its propositional argument can be realized as the value of the feature EXTRA together with the introduction of the expletive argument *it*.

For example, consider the following data set:

\[
(30) \quad \begin{align*}
\text{a. } & \text{Fido’s barking annoys me}. \\
\text{b. } & \text{That Fido barks annoys me}. \\
\text{c. } & \text{It annoys me that Fido barks}.
\end{align*}
\]

---

121 See Kim and Sag (2005).
As given here, the verb *annoys* can take either a CP or an NP as its subject. This means that when the verb *annoys* select a CP subject, it can undergo the Extraposition Lexical Rule in (29) as following:

\[
(31) \quad \left\langle \text{annoys} \right\rangle \ \text{ARG-ST} \ \left\langle \text{CP}^{\text{prop}}, \text{NP} \right\rangle \ \Rightarrow \ \left[ \text{ARG-ST} \ \left[ \text{NP}[\text{NFORM it}], \text{NP} \right] \right.
\]

The output *annoys* now selects the expletive *it* as subject and an object NP together with the original CP as an EXTRA element. This output verb will then allow us to generate a structure like the following:

\[
(32) \quad \text{S} \quad \text{VP} \quad \text{NP} \quad \text{It} \quad \text{VP} \quad \text{NP} \quad \text{CP}
\]

As noted in the tree, the two arguments of the verb *annoys* are realized as SPR and COMPS respectively. When it combines with the NP *me*, it forms a VP with the nonempty EXTRA value. This VP then combines with the extraposed clause CP in accordance with the following Head-Extra Rule, forming a complete VP:

\[
(33) \quad \text{Head-Extra Rule:}
\]
As noted, the rule also discharges the feature EXTRA passed up to the head position. This grammar rule reflects the fact that English independently allows a phrase in which a head element combines with an extraposed element as represented in the following:

(34) \[
\text{EXTRA } \langle \quad \rangle \rightarrow \text{H[EXTRA } \langle \square \rangle \rangle
\]

We can observe English freely employs this kind of well-formed phrase condition even in the extraposition of an adjunct element.

(35) a. [[A man came into the room] [that no one knew]].
   b. [[A man came into the room] [with blond hair]].
   c. I [read a book during the vacation [which was written by Chomsky]].

All these examples are licensed by the Head-Extra Rule that allows the combination of a head element with an extraposed element.

Object extraposition is no different. For example, consider the following examples:

(36) a. Ray found the outcome frustrating.
    b. Ray found it frustrating [that his policies made little impact on poverty].

The data mean that the lexical entry for find that selects three arguments can undergo the Extra-position Lexical Rule:

(37) \[
\text{ARG-ST } \langle \text{NP, XP, AP} \rangle \Rightarrow \text{ARG-ST } \langle \text{NP[}\text{it}\text{], AP} \rangle \Rightarrow \text{EXTRA } \langle \text{prop} \rangle
\]

As observed, when the second argument XP is realized not as an NP but as a clause with the semantic type of proposition, the verb yields an extraposed output. This output then can generate sentences like (36) as represented in the following simplified structure:
The verb *found* requires an expletive object and an AP as its complement. It also has a clausal element as its EXTRA element. The first VP thus has a nonempty EXTRA value projected from the verb. This VP then forms a well-formed phrase with the extraposed CP clause.

One additional language independent constraint relevant in the extraposition is that English independently prohibits a CP from having any element to its right stated:

(39)  
   b. Would it surprise you [that John came]?

(40)  
   a. I believe strongly [that the world is round].  
   b. *I believe [that the world is round] strongly.

This constraint basically bars any argument from appearing after a sentential argument:

(41)  
   Ban on the Non-sentence Final Clause (BNFC):  
   English prohibits a clausal element (CP or S) from having any element to its right position.

In the present context this means that there exists no word whose COMPS list contains something after its CP complement.

This constraint, combined with the present analysis of extraposition, can explain the following contrast:

(42)  
   a. *I made [to settle the matter] my objective.*  
   b. I made it [my objective] to settle the matter.  
   c. I made [the settlement of the matter] my objective.

(43)  
   a. *I owe [that the jury acquitted me] to you.*  
   b. I owe it [to you] that the jury acquitted me.
c. I owe [my acquittal] to you.

Verbs like made and owe here take an object and an obligatory predicative phrase (NP for made and PP for owe) as their arguments. This means that when the object is realized as a CP, it must be extraposed to the sentence final position not to violate the BNFC constraint.

12.4 Cleft constructions

12.4.1 Basic Properties

The examples in (44) represent the canonical types of three kinds of cleft constructions: it-cleft, wh-cleft, and inverted wh-cleft in English:

(44) a. It-cleft: In fact it’s their teaching material that we’re using.
    b. Wh-cleft: What we’re using is their teaching material.
    c. Inverted wh-cleft: Their teaching material is what we are using.

These three types of clefts all denote the same proposition as the following simple declarative sentence:

(45) We are using their teaching material.

The immediate question that follow is then why are we using clefts instead of the simple sentence (45)? It is commonly accepted that these three types of clefts share the identical information-structure properties given in (46):

(46) a. Presupposition (Background): We are using X.
    b. Highlighted (Foreground): their teaching material
    c. Assertion: X is their teaching material.

In terms of the structures, these three types of cleft constructions all consist of a matrix clause headed by a copula and a relative-like cleft clause whose relativized argument is coindexed with the predicative argument of the copula. These structural properties can be represented in the formula as given in the following table:

(47) Three main types of cleft constructions:

<table>
<thead>
<tr>
<th>Types of cleft</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) It-cleft</td>
<td>It + be + XPi + Cleft clause</td>
</tr>
<tr>
<td>(b) Wh-cleft</td>
<td>Cleft clause + be + XPi</td>
</tr>
<tr>
<td>(c) Inverted wh-cleft</td>
<td>XPi + be + Cleft Clause</td>
</tr>
</tbody>
</table>

The choice of one rather than another of these three clefts is determined by various formal and pragmatic factors, some of which we will look into here.

12.4.2 Distributional Properties of the Three It-clefts

It-cleft Constructions: As given in (47a), the it-cleft construction has the pronoun it as the subject of the matrix verb be, the highlighted phrase XP, and a cleft clause. The pronoun it here
functions just as a place holder though it is similar to the referential pronoun *it*. For example, it is hard to claim that *it* in the following dialogue has any referential property:

(48) A: I share your view but I just wonder why you think that’s good.
    B: Well I suppose it’s the writer that gets you so involved.

As for the type of foreground XP, we observe that only the limited phrases are used:

(49) a. It was [NP the gauge] that was the killer in the first place.
    b. It was [AdvP then] that he felt a sharp pain.
    c. It was [PP to Stanford] that he gave his full loyalty.
    d. It wasn’t [S till I was perhaps twenty-five or thirty] that I read and enjoyed them.

Phrases such as an infinitival VP, AP, or CP cannot function as the XP:

(50) a. *It was [VP to finish the homework] that John tried.
    b. *It is [AP fond of Bill] that John seems to be.
    c. *It is [CP that Bill is honest] that John believes.

The wh-word that introduces the cleft-clause ranges from *that* to *who* and *which*:

(51) a. It’s the second Monday [that] we get back from Easter holiday.
    b. It was the girl [who] kicked the ball.
    c. It’s mainly the content [which] differs rather than the actual language itself.

**WH-cleft Constructions:** Unlike the it-cleft construction, the wh-cleft construction places a cleft clause in the subject position followed by the highlighted XP in the postcopular position. There exists a wide range of highlighted types. As given in (52), almost all the phrase types can serve as the highlighted XP phrase in the wh-cleft:

(52) a. What you want is [NP a little greenhouse].
    b. What’s actually happening in London at the moment is [AP immensely exciting].
    c. So what is to come is [PP in this document].
    d. What I’ve always tended to do is [VP to do my own stretches at home].
    e. What I meant was [CP that you have done it really well].

Different from it-clefts, the wh-cleft construction allows AP, base VP, and clauses (content clause as in (51), pure S, and even an wh-clause) to serve as the highlighting XP:

(53) a. What you do is [VP wear it like that].
    b. What happened is [S they caught her without a licence].
    c. What the gentleman seemed to be asking is [S how policy would have differed].

**Inverted wh-cleft constructions:** Though the inverted wh-cleft construction is similar to the wh-cleft, not many types can be highlighted:

(54) a. [NP That] is what they’re trying to do.
b. \([S\) What one wonders] is what went on in his mind.
c. \([AP\) Insensitive] is how I would describe him.
d. \([PP\) In the early morning] is when I do my best research.

(55)  
   a. *[\(VP\) Wear it like that] is what you do.
   b. *[\(S\) They caught her without a license] is what happened.
   c. \([CP\) That you have done it really well] is what I meant.

The inverted wh-cleft also can be introduced with the head noun thing, all, or one:

(56)  
   a. \([The last thing I want to do] is to put you to any more trouble personally.
   b. \([All I had to do] was heat it up.

In terms of the cleft clause type, all the wh-words, except which, are possible:

(57)  
   a. That’s when I read.
   b. That was why she looked so nice.
   c. That’s how they do it.
   d. That’s who I played with over Christmas.

12.4.3 Syntactic Structures of the Three Clefts

As noted before, the three types of clefts all provide unique options for presenting ‘salient’ discourse information in a particular serial order. Each of these three types have different syntactic properties which make it hard to drive one from the other. For example, one noticeable difference lies in that only wh-clefts allow bare infinitives as the highlighted XP phrase:

(58)  
   a. What you should do is \([VP \text{ order one first}]\).
   b. *It was \([VP \text{ order one first}]\) that you should do first.
   c. *\([VP \text{ Order one first}]\) is what you should do.

The three are different with respect to the occurrence of an adverbial subordinate clause, too:

(59)  
   a. It wasn’t till I was perhaps twenty-five or thirty that I read them and enjoyed them.
   b. *When I read them and enjoyed them was not until I was perhaps twenty-five.
   c. *Not until I was perhaps twenty-five was when I read them and enjoyed them.

As noted here, the not until adverbial clause appears only in it-clefts.

It is not difficult to find no isomorphic relationships among the three clefts. For example, neither wh-clefts nor inverted wh-clefts allow the cleft clause headed by that:

(60)  
   a. It’s the writer \([\text{that gets you so involved}]\).
   b. *[That gets you so involved] is the writer.
   c. *The writer is \([\text{that gets you so involved}]\).

In addition, only the cleft clause of if-clefts can have the PP wh-head:
(61)  a.  And it was this matter [on which I consulted with the chairman of the Select Committee].
    b.  *[On which I consulted with the chairman of the Select Committee] was this matter.
    c.  *This matter was [on which I consulted with the chairman of the Select Committee].

The lack of such isomorphic relations among the three clefts indicates that the three clefts have no strong syntactic closeness. These do not mean that there exist no commonalities. In terms of its argument structure, it is obvious that the cleft copula *be* selects two arguments which refer to the identical individual.\[122\]

\[
\begin{align*}
\langle \text{be} \rangle & \\
\text{ARG-ST} \langle \text{NP}_1, \text{XP}_1 \rangle & \\
\end{align*}
\]

These two arguments will canonically be realized as SPR and COMPS in syntax:

\[
\begin{align*}
\text{ARG-ST} \langle \text{NP}_1, \text{XP}_1 \rangle & \Rightarrow \\
\text{SPR} \langle \text{NP}_1 \rangle & \\
\text{COMPS} \langle \text{XP}_1 \rangle & \\
\end{align*}
\]

Such an argument realization will generate canonical specificational sentences like the following:

(64)  a.  The recipient of this year’s award is President Kim.
    b.  The one who broke the window was Mr. Kim.

However, there are various different ways of argument realization, depending on how the information structure (IS) is realized. That is, the three types of clefts reflect how the arguments are realized differently with respect to the information structure of the sentence in question. Two common information structure sensitive features are TOPIC and FOCUS which are usually linked to given and new information, respectively. In addition to these two features, we introduce the feature HIGHLIGHT. The feature HIGHLIGHT is similar to the notion of ‘salient’: the information that is most salient in the given context bears this feature. Consider the following simple question and answer dialogue:

(65)  A: What did John drink?
    B: John drank beer.

It is clear that in the expressions ‘John’ and ‘drank’ here are both given information (topic), whereas ‘beer’ is new information (focus). The difference between ‘John’ and ‘drank’ is just

\[122\]The copula in the cleft construction is ‘specificational’, not ‘predicational’. In sentences like *John is happy*, the copula is used as predicational, whereas in sentences like *The culprit is John*, the copula is specificational. One main difference is that in the former the postcopular element denotes the property of the subject whereas in the latter it denotes an individual. See Heycock and Kroch (1999).
that ‘John’ is more salient than ‘drank’ since it is what the sentence is about. This kind of comparison also holds between completive (pure) focus and contrastive focus:

(66) A: Did John drink beer or coke?
B: John drank beer.

Unlike the NP ‘beer’ in (65), the NP ‘beer’ here is focus, but has a contrastive meaning compared to ‘coke’. In this sense, we call ‘beer’ is contrastive focus, the most salient information in this given discourse. The feature HIGHLIGHT is thus given to the topic and contrastive focus. The feature thus can be assigned either to a TOPIC or to a FOCUS expression. These three features are called ‘information-structure (INFO-ST)’, distinguished from phonology (PHON), syntax (SYN), and semantics (SEM) information. Given these, the contrastive focus phrase beer in (66)B will have the following information:

(67) The feature structure means that the nominal element beer refers to an individual i with a beer-relation. This expression is also used as a highlighted focus.

Equipped with this system, we can assume that depending on the realization of these three IS features, TOPIC, FOCUS, and HIGHLIGHT, we have different cleft constructions.

Let’s start with wh-clefts. We assume that wh-clefts reflect the following argument realization of the specificalive be:

(68) Argument Realization for the Wh-cleft Formation:

The two arguments of be are realized as SPR and COMPS in order. The subject here also is TOPIC as well as HIGHLIGHT, functioning as the salient element in the discourse. The coin-indexing relation between the two arguments ensures that the COMPS element specifies the property of the subject. In addition, the highlighted subject carries the feature FREL (free relative)

---

123 See Engdahl and Vallduví (1996) for the arguments introducing the INFO-ST level.
which is assigned to *wh elements like *what, *when, and *where, but not to why or how since they
cannot serve as the head of a free relative clause as seen from the following contrast:

(69) a. He got *what he wanted.
   b. He put the money *where Lee told him to put it.
   c. The concert started *when the bell rang.

(70) a. *Lee wants to meet *who Kim hired.
   b. *Lee bought *which car Kim wanted to sell to him.
   c. *Lee solved the puzzle *how Kim solved it.

In the examples in (69), what, where and when can head the free relative clause in the sense that
they are interpreted as ‘the thing that, the place where, and the time when’. However, this kind
of interpretation is not possible with *who, *which or *how: 124

(71) a. *Who achieved the best result was Angela.
   b. *Which book he read was this.

Given the output in (68), we then can generate a structure like the following:

(72)

\[
\begin{array}{c}
S \\
\text{NP}_i \\
\begin{array}{c}
\text{[FREL +]}
\text{TOP +}
\text{HIGHLIGHT +}
\end{array}
\end{array} \\
\text{VP} \\
\text{NP}_i\text{[FREL +]} \\
\text{S/NP}_i \\
\text{V} \\
\text{NP}_i\text{[FOC +]}
\end{array}
\]

As represented in the structure, the wh-cleft clause functions as a highlight topic. One thing to
notice here is that the wh-clause is treated not as an S but as an NP. The result of combining the
incomplete S *we are using and the filler NP *what cannot be an S since the free relative clause
behaves just like an NP. One simple example can tell us this:

(73) a. I ate what John .
   b. *I meet who John meet.

The object of ate or meet can be only an NP, not an S. The grammar rule in (74) licenses the
combination of the free relative pronoun with the cleft clause missing one expression:

\[124\text{Of course, these elements can introduce an interrogative clause as in Which book he read is a mystery or How he}
\text{did it is a question.}\]
Free-Relative Phrase Rule:

\[ \text{NP}[\text{GAP ( )}] \rightarrow \text{NP}[\text{FREL +}], \text{S}[\text{GAP (NP)}] \]

The grammar rule ensures that when a free relative pronoun combines with a sentence missing one phrase, the resulting expression is not an S but a complete NP. This in turn means that we will take wh-clefts to be similar to examples like (75):

(75)  
   a. The thing we are using is their teaching material.
   b. All we are using is their teaching material.

By taking wh-clefts as a type of free-relative clause construction headed by an NP, we can rule out examples like the following:

(76)  
   a. *[To whom I gave the cake] telephoned me today.
   b. *[That brought the letter] also works in a night club.

The generation of inverted wh-clefts is motivated from a different information structure. In particular, when we want to highlight the second argument of the copula, we have inverted wh-clefts as seeing from the following:

(77)  
      \[ \text{Argument Realization for the Inverted Wh-Cleft:} \]

\[
\left[ \text{ARG-\text{ST}}\left( \text{NP}, \text{XP} \right) \right] \Rightarrow \left[ \text{SPR}\left( \text{XP}, \left[ \text{HIGHLIGHT + TOPIC +} \right] \right) \right] \\
\text{COMPS}\left( \text{NP} \right)
\]

As noted here, unlike the wh-clefts, the discourse salient and highlight information is the second argument. This second argument is also functioning as a topic, as attested by the unnaturalness of an indefinite NP in the position:

(78)  
   a. #A question is what we have been trying to answer.
   b. #A book is what I recommended to you.

Since topic comes first in natural discourse, it will be realized as SPR, generating the following structure:
As noted here, the highlighted topic is not the first argument, but the second argument their teaching material.

Then, why do we have *it*-clef constructions? Is there any contextual motivation for the construction? We assume *it*-clefs are used to highlight the contrastive focus. This is, the construction makes the contrastive focus as the most salient information.

(80) Argument Realization for the It-Cleft Formation Rule:

\[
\text{ARG-ST } \langle \overline{XP}, \overline{YP} \rangle \Rightarrow \begin{cases} 
\langle \text{be} \rangle \\
\langle \text{SPR} \rangle \langle \text{NP}[it] \rangle \\
\langle \text{COMPS} \rangle \langle \overline{YP} [\text{HIGHLIGHT +}] \rangle \\
\langle \text{EXTRA} \rangle \langle \text{CP}[\text{GAP } \overline{2}] \rangle 
\end{cases}
\]

This lexical realization introduces the expletive *it* as the subject, the contrastive focus as the HIGHLIGHT element together with placing the first argument in the extraposition. This work is done through the feature EXTRA, adopting the treatment of it-clefts as an extraposition process (cf. Akamajian 1970, Emonds 1976, Gundel 1978, among others). Notice that unlike wh-clefts, the extraposing cleft clause has no restriction on the feature FREL. This ensures that even a content clause can function as a cleft clause:

(81) a. *That you heard was an explosion.
    b. It was an explosion that you heard.

The output in (80) will then generate a structure like the following:

\[125\text{See Kim and Sag (2005) for the detailed discussion of English extraposition constructions.}\]
This structure is different from wh-clefts in that the HIGHLIGHTED expression is a contrastive focus. In addition, the value of the feature EXTRA is discharged by the grammar rule in (83):

(83) Head-Extra Rule:

\[
\text{EXTRA } \langle \text{ } \rangle \rightarrow \text{H[EXTRA } \langle \text{ } \rangle \text{]}. \]

There are several facts that support such a structure in which the cleft-clause is not a complement of the copula and but is extraposed to the sentential final position. For example, consider the following:

(84) a. It was the boy, I believe, who brought the letter.
    b. It was in the church, presumably, where he married her.

As given here, a parenthetical or an adverb can intervene between the highlighted XP and the cleft clause. If the XP and the cleft clause are both complements of be, such data are not expected. In addition, consider the following coordination data:

(85) a. *It was [beer that Kim drank] and [tango that Lee danced].
    b. It [was beer that Kim drank] and that Mary tasted.

As observed here, the XP and the cleft clause do not form a constituent. This is what the present analysis predicts.

In addition, the present analysis, in which the cleft clause is not a complement of the copula verb but a modifier to the VP, can predict the difference between canonical sentential complement and cleft-clause. Observe that unlike the sentential complement, the cleft clause does not allow its element to be extracted:

(86) a. Which book do you think John put in the box?
b. *Which book is it John that put in the box?

This kind of ungrammatical sentence cannot be blocked if we simply assume that \textit{be} selects a CP as its complement.

Notice that it-clefts have two different subtypes. The examples we have discussed so far contain a syntactic gap in the cleft clause. However, there are it-clefts that do not have any syntactic gap in the cleft clause. Compare the following:

\( (87) \)
\( \text{a. It is Bill [CP/NP that John relies on \_].} \)
\( \text{b. It is Bill [S [on whom] [John relies]].} \)

Even though (87a) the cleft clause contains a gap, the cleft clause is a complete sentence when \textit{John relies} combines with \textit{on whom}. More clear examples will be those with an adjunct element being highlighted:

\( (88) \)
\( \text{a. It was then when we all went to bed.} \)
\( \text{b. It was only gradually that I came to realize how stupid I was.} \)

As a way of explaining this second type of it-clefts, we assume that there is another realization of the copula for it-clefts:

\( (89) \)
\[ \begin{array}{c}
\langle \text{be} \rangle \\
\text{SPR } \langle \text{NP[it]} \rangle \\
\text{COMPS } \langle \text{YP[HIGHLIGHT +]} \rangle \\
\text{EXTRA } \langle S \text{[MOD[\_]]} \rangle \\
\end{array} \]

This means that the EXTRA sentence is modifying the highlighted YP element. Other than this, there is no tight dependency between the cleft clause and the highlighted YP. This realization will then project a structure like the following:
As noted here, the cleft clause functions like a kind of relative clause, modifying the highlight XP.

In sum, the three clefts are different realizations of the IS features, HIGHLIGHT, TOPIC, and FOCUS. What this analysis implies is that the grammar generates different outputs depending on the organization of information structures.

Though with the low occurrence of the three types of cleft constructions in the Corpus it may be hasty to make any strong generalizations, the findings support the previous literature (such as Prince (1978), Collins (1991), and so forth) in that they each have distinct discourse functions.
In particular, we have proposed that the discourse functions, represented by the information structure, tightly interacts with argument realizations. That is, the discourse functions assigned to the two arguments of the copular in a sense determine the type of clefts.

The syntactic analysis sketched here requires a more detailed theoretical considerations to capture further intriguing properties of the three construction.
12.5 Exercises

1. Explain the relationship among the following sentences.
   (i) a. It is difficult for me to concentrate on calculus.
       b. For me to concentrate on calculus is difficult.
       c. Calculus is difficult for me to concentrate on.

2. In terms of object extraposition, there are two different classes of verbs. Observe the following contrast:
   (i) a. Group I: I blame *(it) on you [that we can’t go].
       b. Group II: Nobody expected (it) of you [that you could be so cruel].

   With respect to the occurrence of the expletive *it in object position, there exists a clear contrast here: the expletive is obligatory in Group I, optional in Group II. Find other verbs belonging to the former and the latter, respectively. In addition, try to provide your own way of accounting the difference between these two different types of object extraposition.

3. Draw the tree structure for the following sentences and see what kind of grammar rules are involved in generating these sentences.
   (i) a. This problem will be difficult for the students to solve.
       b. John is hard for us to pretend to want to marry Nancy.
       c. Being lovely to look at has its advantages.
       d. This toy isn’t easy to try to hand to the baby.
       e. This kind of person is hard to find anyone to talk to.
       f. Presents from grandma are easy to help the children to discover.

4. Draw the tree structure for the following sentences and see what kind of grammar rules are involved in generating these sentences.
   (ii) a. It was to Boston that they decided to take the patient ___.
       b. It was with a great deal of regret that I vetoed your legislation ___.
       c. It was Tom who spilled beer on this couch.
       d. It is Martha whose work critics will praise ___.
       e. It was John on whom the sheriff placed the blame ___.
       f. I wondered who it was you saw.
       g. I was wondering in which pocket it was that Kim had hidden the jewels.

5. Draw tree structures for the following two sentences and see if there are any structural differences.
   (i) a. John told me that Sara ate the pie that Mary bought.
       b. John told me that Beth will be easy for us to work with.
       c. It is hard to find someone who you can relate to.

   In so doing, make use of the following sentences.
   (ii) a. Beth will be easy for us to work with.
b. Sara ate the pie that Mary bought.

6. Read the following passage and analyze the bracketed sentences as far as you can.

(i) [The misfortunes of human beings may be divided into two classes]: First, those inflicted by the non-human environment and, second, those inflicted by other people. As mankind have progressed in knowledge and technique, the second class has become a continually increasing percentage of the total. In old times, famine, for example, was due to natural causes, and although people did their best to combat it, large numbers of them died of starvation. [At the present moment large parts of the world are faced with the threat of famine], but although natural causes have contributed to the situation, the principal causes are human. For six years the civilized nations of the world devoted all their best energies to killing each other, and [they find it difficult suddenly to switch over to keeping each other alive]. Having destroyed harvests, dismantled agricultural machinery, and disorganized shipping, [they find it no easy matter to relieve the shortage of crops in one place by means of a superabundance in another], as would easily be done if the economic system were in normal working order. As this illustration shows, it is now man that is man’s worst enemy. [Nature, it is true, still sees to it that we are mortal], but with the progress in medicine it will become more and more common for people to live until they have had their fill of life. We are supposed to wish to live forever and to look forward to the unending joys of heaven, of which, by ‘miracle, the monotony will never grow stale. But in fact, if you question any candid person who is no longer young, he is very likely to tell you that, having tasted life in this world, he has no wish to begin again as a ‘new boy’ in another. For the future, therefore, [it may be taken that much the most important evils that mankind have to consider are those which they inflict upon each other through stupidity or malevolence or both].

\[\text{From 'Ideas that Have harmed Mankind' by Bertrand Russell}\]

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