☞ THE BASICS BOX: *Rules of compositional interpretation*
- ✓ The interpretation component of the grammar must be able to interpret all acceptable structures generated by the syntax component.
- ✓ It includes rules that specify what happens with semantically empty material and non-branching trees.
- ✓ Many modifiers are interpreted intersectively with the category they modify. The rule Predicate Modification handles them. Some modifiers have a different semantics. An example is the intensional adjective *former*.
- ✓ Verbs and prepositions denote relations; in a sentence, the number of places in the relation must match the number of individuals.

4. Selected references

We continue to follow the perspective in standard semantics textbooks, especially Heim and Kratzer (1998), with the noted difference that we use a set theoretic framework rather than functions. Again take a look at the references given at the end of Chapter I-5.

The distinction between different types of adjectives, with the rough subdivision between intersective and non-intersective ones, can be traced back to Montague's work (cf. the papers in Montague and Richardson 1974 and Dowty, Wall and Peters 1981), but see especially also Kamp (1975), Parsons (1970), Kamp and Partee (1995). In this connection, Partee offers an interesting discussion of the issues in a research historical context (Partee 2007). You might want to read Partee's recent work if you are interested in the differences between the interpretive possibilities of adjectives – e.g. further subdivisions amongst the non-intersective adjectives – and the article contains, alongside the English data, further and more complex data sets from Polish. A proper handling of intensional phenomena requires a proper intensional semantic framework, e.g. von Fintel and Heim (2011) (cf. also Partee 1973, Kratzer 1998, 2011, Portner 2009). We have merely provided an impression, with *former*, of what it is supposed to do. We provide a basic interpretation of tenses in Chapter II-7 (cf. also the references there on the topic).

Chapter I-8
NP semantics

I'm Nobody! Who are you? Are you - Nobody – too?
(Emily Dickinson, *I'm Nobody! Who are you?*)

In this chapter, we extend the semantic theory to NPs with the definite determiner *the* and to NPs with quantificational determiners like *every*, *most* and *some*. Definite NPs are presuppositional. With the notions presupposition and quantification, we introduce two central topics in semantics.

1. Definites: referential NPs with presuppositions

We decided in chapter 6 that definite NPs like *the president of the US* denote an individual, e.g. Barack Obama at the time of writing this textbook. How does this meaning arise? Remember once more that we are committed to compositionality. The interpretation of definite NPs comes about by combining their syntactic components, which are the definite determiner *the* and its N' sister. We have analyzed nouns and N's as denoting sets of individuals. Thus, we know that *president of the US* is the set of all individuals that are US presidents. The question is how such a set combines with *the* to yield the referent of the NP.

Here are some more examples of definite descriptions and their referents:

(1) a. *The opera by Beethoven* : Fidelio
     b. *The capital of New Zealand:* Wellington
     c. *The positive square root of 4* : 2
     d. *The first woman to climb Mt Cook* : Freda du Faur

A pattern emerges from these examples. The denotations of all the N' constituents above are sets containing just one element. There is only one opera composed by Beethoven; New Zealand has exactly one capital; there is only one positive square root of four; and the predicate *first woman to*

climb Mt Cook is true of just one individual. The following generalization can be established:

(2)   For any constituent N' and any situation s:
       If $[[N']]^s$ is a set M that contains exactly one element,
       then $[[the\ N']]^s$ is the unique element of M.

But what if M is a set that does not contain anything, or more than one thing? Let us consider some such examples:

(3)   a.   *The opera by Mozart*
       b.   *The capital of South America*
       c.   *The square root of 4*
       d.   *The king of Boston*

In these examples, you do not know who or what would be referred to by the NP. In our terms, all of these expressions seem to have no denotation. There is nothing ill-formed in their syntactic structure, but their semantics is not well-defined. The difference from the previous examples is that the denotation of the N' is a set that has either more than one element (in (3a,c)) or no element at all (in (3b,d)). Our semantics needs to take this restriction into account. The following rule of composition interprets definite NPs:

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the

If $X = [_{NP}\ the\ N']$ then for any s: $[[the\ N']]^s$ is only defined if there is exactly one z such that $z \in [[N']]^s$. Then, $[[the\ N']]^s$ is that z.

This rule reflects the Fregean interpretation for *the*. When the definedness condition in the rule is met, the definite NP refers to an individual. However, the rule can also lead to an undefined interpretation: it is possible for a definite NP not to have a referent. This happens when the definedness condition in the rule is not met. What about a full sentence that contains a definite NP which does not have a denotation? Consider the following sentence.

(4)   *The capital of South America lies at a high altitude.*

The sentence is just as odd as the NP (3b). Our system of compositional interpretation leads us to expect that when the interpretation of a daughter

constituent is undefined, then the denotation of the mother will also be undefined. In the example, we would wish to apply the Subject-Predicate rule, but the subject *the capital of South America* does not have a denotation. Hence we cannot determine whether or not its denotation is an element of the predicate, rendering the denotation of the whole sentence undefined. Therefore (4) is neither true nor false.

The condition that there be exactly one element in the N'-denotation is a **presupposition** (PSP for short) A presupposition needs to be true for the sentence to be either true or false. When the presupposition is false, the sentence is not false, but undefined. A presupposition is a definedness condition. We model the intuition that a sentence like (4) is inappropriate as undefinedness.

Let us look at the motivation for this in more detail. It is clear that (4) is not true (and neither are further examples like *The king of Boston enjoys Reese's Peanut Butter Cups* – you can think about further relevant data yourself). But why don't we just say that (4) is false? An important argument comes from negation. When we negate a false sentence, we get a true outcome. (5b) is true iff (5a) is false.

(5)   a.   *It is raining.*
       b.   *It is not raining*

But negating (4) above yields a result that is judged as odd as (4) itself. (6) is not a true sentence. If (4) were simply false, then (6) should be true. The judgement that neither (4) nor (6) are true is modeled in the analysis as both their denotations being undefined.

(6)   *The capital of South America doesn't lie at a high altitude.*

Let us look at a second example of presupposition (example taken from Heim and Kratzer):

(7)   *John is absent again today.*
       (i)   PSP: John has been absent before.
       (ii) Assertion: John is absent today.

(8)   *Today is not the first time that John is absent.*
       (i)   PSP: John is absent today.
       (ii) Assertion: John has been absent before.

(9)   *John is absent today and that has happened before.*
  (i)   no PSP
  (ii) Assertion: John is absent today and
                    John has been absent before

(7)–(9) are appropriate in different contexts. Imagine yourself walking into your friend Robin's room and uttering (7). This is ok if Robin knows that John has been absent in the past; but if she doesn't know this, (7) is not quite appropriate. (9) would have been a better choice. Similarly with (8): (8) is a decent way to inform Robin that John has been absent in the past if she already knows that he is absent today. But if she doesn't know this, then (8) is an odd thing to say. Once again, (9) would have been more appropriate. Intuitions about appropriateness are part of native speakers' knowledge. The grammar thus needs to capture them. Such intuitions motivate the distinction between assertion and presupposition.

Similar intuitions can be observed in examples with the definite determiner. Consider (10) vs. (11):

(10)   *The excursion to the semantics labs at MIT will be on April 20th.*

(11)   *There will be an excursion to the semantics labs at MIT, which will be on April 20th.*

The sentence in (10) is not appropriate to inform people that there will be an excursion to the MIT semantics labs. It can only be used appropriately if this is already known. If it isn't, (11) would be the way to convey this information. (10) presupposes that there will be an excursion to the semantics labs at MIT, while (11) asserts it. Consider also:

(12)   *John didn't go on the excursion to the semantics labs at MIT on April 20th.*

If the condition that there be an excursion to the semantics labs at MIT was asserted, not presupposed, then we would expect the sentence to be true if there was no excursion. (Remember what we said about negation: a negated sentence is true iff the sentence without the negation is false.) However, intuitively, the sentence is inappropriate in that case. Our other example of a presupposition introducing element from (7), *again*, allows us to see the same thing:

(13)   *John isn't absent again today.*

This denies that John is absent today, not that he had been absent before. (13) is true in a situation in which John had been absent before and he is not absent today. So when we negate (7), the presupposition still has to be true. Only the assertion of (7) is negated. This is generally the case when sentences that have presuppositions are negated. The presupposition survives the negation. This is a characteristic behavior of presupposition, which also motivates distinguishing it from assertion.

To sum up, the definite article has introduced us to the notion of presupposition. A presupposition is a meaning component that has to be distinguished from assertion. The following types of intuition motivate the distinction: A sentence with a presupposition can only be appropriately used if the presupposition is known. When such a sentence is negated, the presuppostion still has to be true. It seems unaffected by the negation. Presuppositions are modeled in our grammar as definedness conditions.

One more remark has to be made regarding the uniqueness condition in the definition of *the:* the element fullfilling the description of the N' sister of *the* has to be unique in the context of the disourse, not in the entire world. Otherwise, we would never be able to say perfectly normal things like *the cat is asleep.* We can say *the cat is asleep* if in the context of the utterance, there is a unique cat (for example the only cat in the house). We will read the *the* rule in this way.

To see the rule at work, let's go through a sample calculation:

(14)   For any s:
        $[\![\ [_{IP}\ [_{NP}\ the\ [_{N'}\ president]]\ [_{I'}\ left]]\ ]\!]^s$ is defined only if
        $[\![\ [_{NP}\ the\ [_{N'}\ president]]\ ]\!]^s$ is defined. This is the case only if there is a unique z such that z is president in s. If this is the case, then:

        For any s:
        $[\![\ [_{IP}\ [_{NP}\ the\ president]\ [_{I'}\ left]]\ ]\!]^s = 1$ iff
        $[\![\ [_{NP}\ the\ president]\ ]\!]^s \in [\![\ [_{I'}\ left]\ ]\!]^s$ iff
        for the unique z such that z $\in [\![\ [_{N'}\ president]\ ]\!]^s$: z $\in [\![\ [_{I'}\ left]\ ]\!]^s$ iff
        for the unique z such that z $\in [\![president]\!]^s$: z $\in [\![\ [_{I'}\ left]\ ]\!]^s$ iff
        for the unique z such that z $\in$ {x: x is president in s}: z $\in [\![\ [_{I'}\ left]\ ]\!]^s$ iff
        for the unique z such that z is president in s: z $\in [\![\ [_{I'}\ left]\ ]\!]^s$ iff
        for the unique z such that z is president in s: z $\in$ {x: x left in s} iff

for the unique z such that z is president in s: z left in s

🕓 **Exercise.** Caculate the definedness and truth conditions of the sentence below.

(E1)   *The French student loves Pat.*   □

There are lots more expressions (besides *the* and *again*) that introduce presuppositions. These expressions are called **presupposition triggers.** We give a few examples below.

(15)   Factive verbs:
   a.   *Vera **regrets** upsetting the editor.*
   b.   PSP: Vera has upset the editor.

(16)   Aspectual verbs:
   a.   *Konstantin has **stopped** smoking.*
   b.   PSP: Konstantin has smoked in the past.

(17)   Cleft sentences:
   a.   *It **was** in May that Nadine left Harvard.*
   b.   PSP: Nadine left Harvard sometime.

(18)   Pseudoclefts:
   a.   ***What** Sonja destroyed was her juicer.*
   b.   PSP: Sonja destroyed something.

(19)   *Too:*
   a.   *ANNA went to 'Sinn und Bedeutung', **too**.*
   b.   PSP: Someone other than Anna went to 'Sinn und Bedeutung'.

🕓 **Exercise.** Convince yourself that the (a)-sentences really have the presuppostions under (b). You can use intuitions on appropriateness, and you can also negate the sentences to see which meaning components are stable under negation. Negation is actually one of a family of environments that can be used to detect presuppositions. Identify those environments from the examples below and apply them to (15)-(19) as well.

(E2)   a.   *Is John absent again today?*
   b.   *Maybe John is absent again today.*
   c.   *If John is absent again today, Pritty gets to eat Polina's chocolate.*   □

🖴 **Exercise.** An important topic in the research on presupposition is the so-called **projection problem for presuppositions.** The problem can be formulated as follows: How are the presuppositions of a sentence determined by the presuppositions of its parts? To take a specific (and important) example, recall negation and the examples in (7) and (13). There, the presupposition "survives" when the sentence is negated. Or, in other words: The presupposition of the sentence as a whole, (13), is inherited from the non-negated sentence contained in it, (7). Such observations have led some linguists in the early days of research on presupposition to postulate the following hypothesis:

The Cumulative Hypothesis (Langendoen & Savin)
Complex sentences inherit all of the presuppositions of their constituent clauses.

Which of the following examples support the Cumulative Hypothesis? Which examples falsify it?

(E3)   a.   *It wasn't Pat who solved the problem.*
   b.   *If there is a king of France, then the king of France is in hiding.*
   c.   *If it wasn't Pat who solved the problem, then I wonder who will be awarded the Nobel Prize.*
   d.   *If the problem was difficult, then it wasn't Pat who solved it.*
   e.   *Either it is Pat who solved the problem or they have awarded the Nobel Prize to the wrong person.*
   f.   *If the problem has been solved, it wasn't Pat who solved it.*
   g.   *It isn't likely that it was Pat who solved the problem.*
   h.   *Either it is Pat who solved the problem or the problem hasn't been solved.*   □