LIN6049 Advanced Semantics: Puzzles in Meaning
2022/2023

Handout 5: review

Obligatory reading: re-read obligatory readings from previous weeks
Optional reading: re-read optional readings from previous weeks

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1 Goals of the module

To improve our semantic theory from *Intro to Semantics* for English and for other languages
→ to improve our explanation for how human language/cognition works

Like in *Intro to Semantics*, we take a sentence with its syntactic structure, and suitable meanings for words (and morphemes), and use rules to provide the sentence with meaning

2 Our model for English from *Intro to Semantics*

Lexicon

$[\![\text{Luisa}]\!]^s$ = the individual called Luisa in s (and so on for other proper nouns)

$[\![\text{sleeps}]\!]^s$ = {x: x sleeps in s} (and so on for other intransitive verbs)

$[\![\text{gray}]\!]^s$ = {x: x is gray in s} (and so on for other intersective adjectives)

$[\![\text{tall}]\!]^s$ = {x: x's height is above the height standard in s} (and so on for other context-sensitive adjectives)

$[\![\text{dog}]\!]^s$ = {x: x is a dog in s} (and so on for other common nouns)
…etc.

Compositional rules

1. Subject-predicate: If S has NP as its subject and VP as its predicate, $[\![S]\!]^s = 1$ in s if $[\![NP]\!]^s \in [\![VP]\!]^s$ or $[\![VP]\!]^s \in [\![NP]\!]^s$
2. Non-branching nodes: If X is a non-branching node with daughter Y, $[\![X]\!]^s = [\![Y]\!]^s$
3. Nodes with a meaningless daughter: If X has a meaningless daughter (*a*, *be*) and another daughter Z, $[\![X]\!]^s = [\![Z]\!]^s$
4. Predicate Modification: If X has Y and Z as its only daughters and Y and Z denote sets of individuals, $[\![X]\!]^s = [\![Y]\!]^s \cap [\![Z]\!]^s$
5. *Former*: If X has an AP headed by *former* and N' as its daughters, $[\![X]\!]^s$ = {x: there is an s' before s such that $x \in [\![N']\!]^{s'}$}
6. *And*$_1$: If S_3 has three daughters, S_1, *and* and S_2, $[\![S_3]\!]^s = 1$ in s if $[\![S_1]\!]^s = 1$ in s and $[\![S_2]\!]^s = 1$ in s
7. *And*$_2$: If X has three daughters Y*, and* and Z, and Y and Z denote sets of individuals, $[\![X]\!]^s = [\![Y]\!]^s \cap [\![Z]\!]^s$
8. *The*: If X is an NP with Det *the* and N' as daughters, $[\![X]\!]^s$ is only defined if there is exactly one z in s such that $z \in [\![N']\!]^s$; if defined, $[\![X]\!]^s$ is that z

3 Changes we've introduced in our model for English

Lexicon

$[\![\text{Luisa}]\!]^s$ = the individual called Luisa in s (and so on for other proper nouns)

$[\![\text{sleeps}]\!]^s$ = {x: x sleeps in s} (and so on for other intransitive verbs)

$[\![\text{gray}]\!]^s$ = {x: x is gray in s} (and so on for other intersective adjectives)

$[\![\text{tall}]\!]^s$ = {x: x's height is above the height standard in s} (and so on for other context-sensitive adjectives)

→ $[\![\text{dog}]\!]^s$ = {x: x is an atomic or non-atomic dog in s} (and so on for other common noun roots)

→ $[\![\text{-}\emptyset]\!]^s = [\![\text{+atomic}]\!]^s$ = {x: x is an atom in s} (singular morphology for nouns)

→ $[\![\text{-s}]\!]^s = [\![\text{–atomic}]\!]^s$ = {x: x is a non-atom in s} (plural morphology for nouns)

…etc.

Compositional rules

1. Subject-predicate: If S has NP as its subject and VP as its predicate, $[\![S]\!]^s$ = 1 in s if $[\![NP]\!]^s \in [\![VP]\!]^s$ or $[\![VP]\!]^s \in [\![NP]\!]^s$
2. Non-branching nodes: If X is a non-branching node with daughter Y, $[\![X]\!]^s = [\![Y]\!]^s$
3. Nodes with a meaningless daughter: If X has a meaningless daughter (*a*, *be*) and another daughter Z, $[\![X]\!]^s = [\![Z]\!]^s$
4. Predicate Modification: If X has Y and Z as its only daughters and Y and Z denote sets of individuals, $[\![X]\!]^s = [\![Y]\!]^s \cap [\![Z]\!]^s$
5. *Former*: If X has an AP headed by *former* and N' as its daughters, $[\![X]\!]^s$ = {x: there is an s' before s such that $x \in [\![N']\!]^{s'}$}
6. And_1: If S_3 has three daughters, S_1, *and* and S_2, $[\![S_3]\!]^s$ = 1 in s if $[\![S_1]\!]^s$ = 1 in s and $[\![S_2]\!]^s$ = 1 in s
7. And_2: If X has three daughters Y, *and* and Z, and Y and Z denote sets of individuals, $[\![X]\!]^s = [\![Y]\!]^s \cap [\![Z]\!]^s$
8. → *The*: If X is an NP with Det *the* and N' as daughters, $[\![X]\!]^s$ is only defined if there is a maximal z in s such that $z \in [\![N']\!]^s$; if defined, $[\![X]\!]^s$ is that z

Assumptions

→ Distributive VPs denote sets of atomic and non-atomic individuals
Collective VPs denote sets of non-atomic individuals

Question 1: what else in our model for English needs to be changed, given the introduction of singularity and plurality?

-the denotation of adjectives? (→ puzzle 5!)
-the denotation of and_2? (since we used it for sentences such as *Lolo is brown and furry*, with adjectives, and maybe we need to reconsider adjectives)
-the denotation of quantifiers?

Question 2: what else in our model for other languages needs to be changed, given the introduction of a semantics for grammatical number?

Question 3: what else in our model for language/semantic competence more generally needs to be changed, given the introduction of a semantics for grammatical number?

4 Towards a general model of semantic competence

Lexicon (languages have some or all of these)

For PN a proper name: $[\![PN]\!]^s$ = the individual called PN in s

For V an intransitive verb: $[\![V]\!]^s = \{x: x \text{ Vs in } s\}$

For IA an intersective adjective: $[\![IA]\!]^s = \{x: x \text{ is IA in } s\}$

For N a common noun root: $[\![N]\!]^s = \{x: x \text{ is an atomic or non-atomic N in } s\}$

$[\![+\text{atomic}]\!]^s = \{x: x \text{ is an atom in } s\}$

$[\![-\text{atomic}]\!]^s = \{x: x \text{ is a non-atom in } s\}$

Compositional rules I (all languages have all of these)

1. Subject-predicate: If S has NP as its subject and VP as its predicate, $[\![S]\!]^s = 1$ in s if $[\![NP]\!]^s \in [\![VP]\!]^s$ or $[\![VP]\!]^s \in [\![NP]\!]^s$

2. Non-branching nodes: If X is a non-branching node with daughter Y, $[\![X]\!]^s = [\![Y]\!]^s$

3. Nodes with a meaningless daughter: If X has a meaningless daughter and another daughter Z, $[\![X]\!]^s = [\![Z]\!]^s$

Compositional rules II (languages have no, or some, or all of these)

1. Predicate Modification: If X has Y and Z as its only daughters and Y and Z denote sets of individuals, $[\![X]\!]^s = [\![Y]\!]^s \cap [\![Z]\!]^s$

2. *Former* (or its equivalent in other languages): If X has an AP headed by *former* and N' as its daughters, $[\![X]\!]^s = \{x:$ there is an s' before s such that $x \in [\![N']\!]^{s'}\}$

3. *And*$_1$ (or its equivalent in other languages): If S_3 has three daughters, S_1, *and* and S_2, $[\![S_3]\!]^s = 1$ in s if $[\![S_1]\!]^s = 1$ in s and $[\![S_2]\!]^s = 1$ in s

4. *And*$_2$ (or its equivalent in other languages): If X has three daughters Y*, and* and Z, and Y and Z denote sets of individuals, $[\![X]\!]^s = [\![Y]\!]^s \cap [\![Z]\!]^s$

5. *The* (or its equivalent in other languages): If X is an NP with Det *the* and N' as daughters, $[\![X]\!]^s$ is only defined if there is a maximal z in s such that $z \in [\![N']\!]^s$; if defined, $[\![X]\!]^s$ is that z

6. If X = [Y [+minimal]], $[\![X]\!]^s = \{x: x \in [\![Y]\!]^s$ and x is simplest in $[\![Y]\!]^s\} = \{x: x \in [\![Y]\!]^s$ and x has no parts in $[\![Y]\!]^s\}$

7. If X = [Y [–minimal]], $[\![X]\!]^s = \{x: x \in [\![Y]\!]^s$ and x is not simplest in $[\![Y]\!]^s\} = \{x: x \in [\![Y]\!]^s$ and x has parts in $[\![Y]\!]^s\}$

Assumptions (languages will have no, or some, or all of these)

Distributive VPs denote sets of atomic and non-atomic individuals
Collective VPs denote sets of non-atomic individuals

Some more questions:

-how do languages that allow null subjects (e.g., Spanish) interpret subjects and predicates?

-what predictions are made for adjectives, quantifiers, or the definite article in languages that have a dual? How should we adapt their denotations (if indeed we have to)?

-for English, we can say that $[\![\text{three N'}]\!]^s = \{P: I[\![N']\!]^s \cap Pl = 3\}$. The N here, however, must be plural (**three dog*, ✓*three dogs*). What meaning do we predict for *three dogs*, and is it the correct meaning?

-how do distributive and collective VPs combine with quantified subjects, and do we make the correct predictions for the sentences they form?

-is it possible to imagine a language that doesn't distinguish collective from distributive VPs? What would it look like?

-do all languages with adjectives have adjectives of the *former*-type, which require a rule different from Predicate Modification?