Ling 320. Lecture Notes. 25 Sept 2007.

1. Exam 1

(a) What to know for the exam:

-How to identify an inference as an entailment vs. implicature, presupposition vs. assertion, and how to provide justification for your answer;
-What a *scalar implicature* is (Levinson, Section 3.2.3, pp. 132-134);
-The list of environments that reverse entailment patterns (Section 5 from the Sept. 18th Lecture Notes).
-Set theory.

(b) What the exam will *not* cover:

-Section 2.2 ("A Bigger Picture") from the Sept. 13th lecture notes.
-Section 3 ("*There*-Existentials") from the Sept. 13th lecture notes.
-Inclusive vs. exclusive *or*.
-Set theoretic equalities (the laws on p. 18 of the Set Theory assigned reading.)
-Anything regarding truth conditions or the derivation thereof.

(c) How to study for the exam:

-Review the solutions to Assignments 1 & 2. If you have any questions, bring them to class on Thursday (the 27th).
-Review the solution to Assignments 3 once it's posted on Thursday.
-If you want extra practice with set theory, do the problems on the handout that says "0 Definitions" on the top left corner. A solution will be posted online.

2. More Set Theory Practice

True or False? Assume that U = $\{x \mid x \text{ is in this classroom}\}$

(i)	$\{x \mid x \text{ has brown eyes}\} = \{y \mid y \text{ has brown eyes}\}$	T
(ii)	$\{x \mid x \in \{y \mid y \text{ has brown eyes}\}\} = \{x \mid x \text{ has brown eyes}\}$	T
(iii)	$\{x \mid x \in \{y \mid y \in \{z \mid z \text{ has brown eyes}\}\}\} = \{x \mid x \text{ has brown eyes}\}$	T

3. Truth Conditional Semantics[1]

To know the meaning of a sentence is to know its *truth conditions*. That is, to know the meaning of a sentence is to know what conditions would have to hold - what the world would have to be like - for the sentence to be true.

For example, in knowing the meaning of (1)

(1) Alec is sitting.

you might not know whether the sentence is in fact true or false; what you do know is what circumstances would have to be like for (1) to be true.

We want a theory of meaning, then, that matches sentences with their truth conditions. We want a theory that gives us, for any situation *s*, and any sentence *S*:

(2) *S* is true in *s* iff *p*.

Where *p* describes the conditions that must obtain for *S* to be true in *s*.

To know the meaning of a sentence, then, is to know what a situation has to be like in order for the sentence to be true in it.

> What are situations? Situations describe the ways things are, have been, or could be. For example: the situation of us in this classroom right now, the situation of you waking up this morning, the situation of you on this date five years from now, the situation of the earth being a cube, etc.

In this sense, sentences *categorize* situations: they separate those situations in which the sentence is true from those in which the sentence is false.

Because there are an infinite number of sentences in English, we cannot just have memorized the truth conditions for every sentence. Rather, we must have some way of deriving the truth conditions of a sentence based on the semantic contributions of its parts, and they way in which they are assembled syntactically.

What are the parts of a sentence, and how are they assembled syntactically?

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[1] Some references on this material: Heim & Krater (1998), Chierchia & McConnel-Ginet (1990, 2000), Portner (2004).

4. Syntactic Assumptions

Because the meaning of a sentence depends on how words are organized into sentences, we need to make clear our assumptions about the structure of sentences.

Syntax concerns the rules that govern how words are assembled into sentences.

Last time, we started with simple sentences whose subject is a proper noun and whose predicate is an intransitive verb:[2]

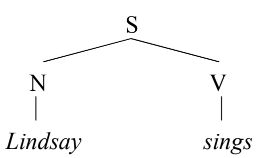
(3) *Laure smokes*. *Carla drinks*. *Lindsay sings*. *Gorka dances*.

We posited some general rules for forming such sentences as follows:

(4) S → N V
N → *Laure*, *Carla*, *Lindsay*, *Gorka*
V → *smoke*, *drink*, *sing*, *dance*

These rules *generate* sentences. Their output can be represented in the form of a tree structure, as in the following:

(5)



Some terminology for trees:

(6) a. The lines are called *branches*.

b. The endpoints of branches are called *nodes*.
For example, in (5): *S*, *N*, *V*, *Lindsay*, *sings*.

c. The lowest nodes are called *terminal nodes*.
E.g., *Lindsay*, *sings*.

d. In (5), S is the *mother* of N and V.
N is the *daughter* of S.
V is the *daughter* of S.

The goal of syntax is to come up with rules that generate *all and only* those sentences that are judged grammatical by native speakers.

For example, our rules do not yet generate the following sentences of English:

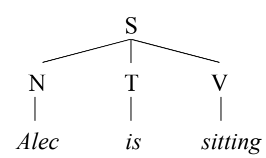
(7) *Laure is smoking*. *Carla is drinking*. *Lindsay is singing*. *Gorka is dancing*.

We can revise our rules so that they do generate these sentences, by adding a new category for the auxiliary verb *be*, which will call T (Tense). We then modify our S rule so that T optionally occurs between N and V:

(8) S → N (T) V
N → *Laure*, *Carla*, *Lindsay*, *Gorka*, *Alec*
V → *smoke*, *drink*, *sing*, *dance, sit*
T → *be*

With these revised rules, we generate sentences such as:

(9)



From here we can make further revisions (see class discussion):

(10) S → NP (T) VP   NP → N   VP → V
N → *Laure*, *Carla*, *Lindsay*, *Gorka*, *Alec*, …
V → *smoke*, *drink*, *sing*, *dance*, *sit*, …   T → *be*   VP → VP Conj VP

With these revised rules, we generate sentences such as:

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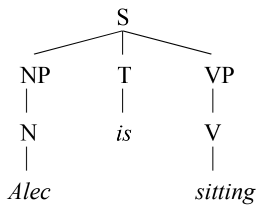
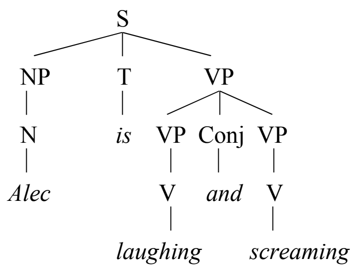
[2] An *intransitive* verb is a verb that does not take an object, as in (i); a *transitive* verb is a verb that does take an object, as in (ii).
(i) *Gorka disappeared*.
(ii) *Gorka drank some tea*.

(11)



(12)

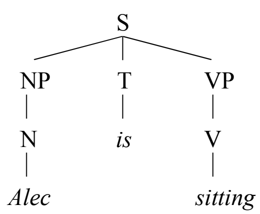


We will be revising our syntactic rules throughout the semester, as we try to account for more and more sentences of English.

4. Back to Semantics. Having established some syntactic rules, we now need rules for interpreting the structures that the syntactic rules output.

For example, we want to derive the truth conditions for the sentence in (13), based on the meaning of its parts, and how they are assembled syntactically.

(13)



What does each part mean?

We need a set of rules that assign to each node its meaning.

5. A Grammar of a Small Fragment of English

Our aim in building a grammar of a small fragment of English is to model a native speaker's ability to produce and interpret sentences. We want ultimately to develop a system of rules that generate and interpret *all and only* sentences of English. Again, we will constantly be revising our grammar to account for more and more sentences.

Our grammar has three components:

(i) A *lexicon*, which states the category and denotation of each word;
(ii) A set of *syntactic rules*, which assemble words into sentences;
(iii) A set of *semantic rules of composition*, which assign an interpretation to every node of a tree.

Notation: $[\![\alpha]\!]^s$ symbolizes the denotation of α in situation *s*.
$[\![\alpha]\!]^s$ is read as "The denotation of α in *s*".

<u>(i) Lexicon</u>

N's: $[\![\textit{Laure}]\!]^s$ = Laure, $[\![\textit{Carla}]\!]^s$ = Carla, $[\![\textit{Alec}]\!]^s$ = Alec, …

V's: $[\![\textit{sitting}]\!]^s = \{x \mid x \text{ is sitting in } s\}$, $[\![\textit{sleeping}]\!]^s = \{x \mid x \text{ is sleeping in } s\}$, …

Conj's: $[\![\textit{and}]\!]^s = \cap$

T's: *be*

Note: We will neglect for now the semantic contribution of the T node.

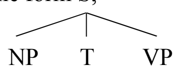
<u>(ii) Syntactic rules</u>

S → NP (T) VP   NP → N   VP → V
N → *Laure*, *Carla*, *Lindsay*, *Gorka*, *Alec*, …
V → *smoke*, *drink*, *sing*, *dance*, *sit*, …   T → *be*
VP → VP Conj VP

<u>(iii) Semantic rules of composition</u>

For any situation s,

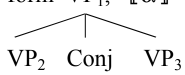
(a) If α has the form S, $[\![\alpha]\!]^s = 1$ iff $[\![\text{NP}]\!]^s \in [\![\text{VP}]\!]^s$.



(b) If α is a non-branching node whose daughter node is β, then $[\![\alpha]\!]^s = [\![\beta]\!]^s$.

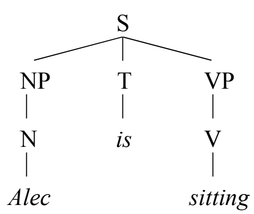
(c) If α is a terminal node, then $[\![\alpha]\!]^s$ is specified in the lexicon.

(d) If α has the form VP_1, $[\![\alpha]\!]^s = [\![\text{VP}_2]\!]^s\ [\![\text{Conj}]\!]^s\ [\![\text{VP}_3]\!]^s$.



6. Some Example Derivations

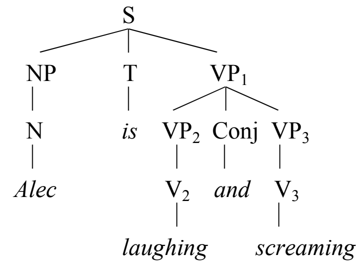
(14)



For any s, $[\![\text{S}]\!]^s = 1$ iff

$[\![\text{NP}]\!]^s \in [\![\text{VP}]\!]^s$	by (a)
$[\![\text{N}]\!]^s \in [\![\text{VP}]\!]^s$	by (b)
$[\![\textit{Alec}]\!]^s \in [\![\text{VP}]\!]^s$	by (b)
Alec $\in [\![\text{VP}]\!]^s$	by (c)
Alec $\in [\![\text{V}]\!]^s$	by (b)
Alec $\in [\![\textit{sitting}]\!]^s$	by (b)
Alec $\in \{x \mid x$ is sitting in $s\}$	by (c)
Alec is sitting in s	by def. $\in$

(15)



For any s, $[\![\text{S}]\!]^s = 1$ iff

$[\![\text{NP}]\!]^s \in [\![\text{VP}_1]\!]^s$	by (a)
$[\![\text{N}]\!]^s \in [\![\text{VP}_1]\!]^s$	by (b)
$[\![\textit{Alec}]\!]^s \in [\![\text{VP}_1]\!]^s$	by (b)
Alec $\in [\![\text{VP}_1]\!]^s$	by (c)
Alec $\in ([\![\text{VP}_2]\!]^s\ [\![\text{Conj}]\!]^s\ [\![\text{VP}_3]\!]^s)$	by (d)
Alec $\in ([\![\text{V}_2]\!]^s\ [\![\text{Conj}]\!]^s\ [\![\text{VP}_3]\!]^s)$	by (b)
Alec $\in ([\![\textit{laughing}]\!]^s\ [\![\text{Conj}]\!]^s\ [\![\text{VP}_3]\!]^s)$	by (b)
Alec $\in ([\![\textit{laughing}]\!]^s\ [\![\textit{and}]\!]^s\ [\![\text{VP}_3]\!]^s)$	by (b)
Alec $\in ([\![\textit{laughing}]\!]^s\ [\![\textit{and}]\!]^s\ [\![\text{V}_3]\!]^s)$	by (b)
Alec $\in ([\![\textit{laughing}]\!]^s\ [\![\textit{and}]\!]^s\ [\![\textit{screaming}]\!]^s)$	by (b)
Alec $\in (\{x \mid x$ is laughing in $s\}\ [\![\textit{and}]\!]^s\ [\![\textit{screaming}]\!]^s)$	by (c)
Alec $\in (\{x \mid x$ is laughing in $s\} \cap [\![\textit{screaming}]\!]^s)$	by (c)
Alec $\in (\{x \mid x$ is laughing in $s\} \cap \{x \mid x$ is screaming in $s\})$	by (c)
Alec $\in \{x \mid x$ is laughing and screaming in $s\}$	by def. $\cap$
Alec is laughing and screaming in s	by def. $\in$