Lgcs 106, Semantics. Lecture Notes. Wed 9 Feb 2011.

0. Announcements
-Reminder: Assignment 3 due Monday. Use the following grammar.

1. Class Grammar, as of Mon (2/7)

(i) Inventory of denotations. Let D be the set of all individuals that exist in the actual world. Possible denotations are:

Elements of D, the set of actual individuals.
Elements of {0,1}, the set of truth-values.
Subsets of D.
Subsets of D x D.
Set-theoretic intersection, union, complementation.

(ii) Lexicon

N: $[\![J]\!] = J, \ldots$
V: $[\![laugh]\!] = \{x \mid \text{laugh}(x)\}, \ldots$
V_t: $[\![love]\!] = \{<x, y> \mid \text{love}(x)(y)\}, \ldots$
A: $[\![kind]\!] = \{x \mid \text{kind}(x)\}, \ldots$
A_t: $[\![fond]\!] = \{<x, y> \mid \text{fond}(x)(y)\}, \ldots$
N_{pred}: $[\![cat]\!] = \{x \mid \text{cat}(x)\}, \ldots$
$N_{pred,t}$: $[\![scholar]\!] = \{<x, y> \mid \text{scholar}(x)(y)\}, \ldots$
P: $[\![out]\!] = \{x \mid \text{out}(x)\}, \ldots$
P_t: $[\![above]\!] = \{<x, y> \mid \text{above}(x)(y)\}, \ldots$
T: (We neglect for now the semantic contribution of tense.)
Conj: $[\![and]\!] = \cap$, $[\![or]\!] = \cup$
Neg: $[\![not]\!] = '$

Semantically vacuous: V: *be*; D: *a*; P: *of*.

Lexical rules:

(i) If $[\![V]\!] \subseteq D \times D$, $[\![V_{eod}]\!] = \{x \mid \{y \mid <x, y> \in [\![V]\!]\} \neq \emptyset\}$.
(ii) If $[\![V]\!] \subseteq D \times D$, $[\![V_{pass}]\!] = \{x \mid \{y \mid <y, x> \in [\![V]\!]\} \neq \emptyset\}$.
(iii) If $[\![V]\!] \subseteq D \times D$, $[\![V_{refl}]\!] = \{x \mid <x,x> \in [\![V]\!]\}$.

(iii) Syntax

$TP \rightarrow NP\ T'$ $\quad T' \rightarrow T\ VP$ $\quad NP \rightarrow N$

$VP \rightarrow V\ AP$ $\quad VP \rightarrow V\ PP$ $\quad \mathbf{VP \rightarrow V\ DP}$ $\quad \mathbf{DP \rightarrow D\ NP_{pred}}$

$VP \rightarrow V$ $\quad VP \rightarrow V_t\ NP$
$AP \rightarrow A$ $\quad AP \rightarrow A_t\ PP$
$PP \rightarrow P$ $\quad PP \rightarrow P_t\ NP$
$NP_{pred} \rightarrow N_{pred}$ $\quad NP_{pred} \rightarrow N_{pred,t}\ PP$

$XP \rightarrow \text{Neg } XP$, where $X \in \{N_{pred}, V, A, P\}$
$XP \rightarrow XP\ \text{Conj}\ XP$, where $X \in \{N_{pred}, V, A, P\}$

(iv) Semantic rules of composition

(a) If α has the form $[_{TP}\ NP\ T']$, $[\![\alpha]\!] = 1$ iff $[\![NP]\!] \in [\![T']\!]$.
(b) If α is a non-branching node whose daughter node is β, then $[\![\alpha]\!] = [\![\beta]\!]$.
(c) If α is a terminal node, then $[\![\alpha]\!]$ is specified in the lexicon.
(d) For any X, if α has the form $[_{XP1}\ XP_2\ \text{Conj}\ XP_3]$, $[\![\alpha]\!] = [\![XP_2]\!][\![\text{Conj}]\!][\![XP_3]\!]$.
(e) If α has the form $[_{XP1}\ \text{Neg}\ XP_2]$, $[\![\alpha]\!] = [\![XP_2]\!][\![\text{Neg}]\!]$.
(f) For any X, Y, if α has the form $[_{XP}\ X_t\ YP]$, $[\![\alpha]\!] = \{x \mid <x, [\![YP]\!]> \in [\![X_t]\!]\}$.

2. Practice

(1) Montréal is not a part of Europe.
(2) J hid_{refl} and read_{eod}.

3. Start on Quantificational NPs

(3) Every lion roared.
(4) No cat meowed.
(5) Some student cried.
(6) A student cried.
(7) Two lions roared.

4. Subtypes of Predicates: Stage-level and Individual-level

The basic distinction (Milsark 1974, Carlson 1977):

(8) Some policemen are	available	intelligent	
	naked	handsome	
	in the cruiser	nice guys	
(9) There are some policemen	available	#intelligent	
	naked	#handsome	
	in the cruiser	#nice guys	
	eating donuts	#loving donuts	
	reading Latin	#knowing Latin	
(10) Some policemen were	available	#intelligent	in my office.
	naked	#handsome	
	in the cruiser	#nice guys	
	ate donuts	#loved donuts	
	read Latin	#knew Latin	
(11) Some policemen were	available	#intelligent	last night.
	naked	#handsome	
	in the cruiser	#nice guys	
	ate donuts	#loved donuts	
	read Latin	#knew Latin	
(12) We saw some policemen	available	#intelligent	
	naked	#handsome	
	in the cruiser	#nice guys	
	eat donuts	#love donuts	
	read Latin	#know Latin	
(13) Rob (was)	available	intelligent	
	naked	handsome	
	in the cruiser	a nice guy	
	ate donuts	loved donuts	
	read Latin	knew Latin	

From Carlson (1977):

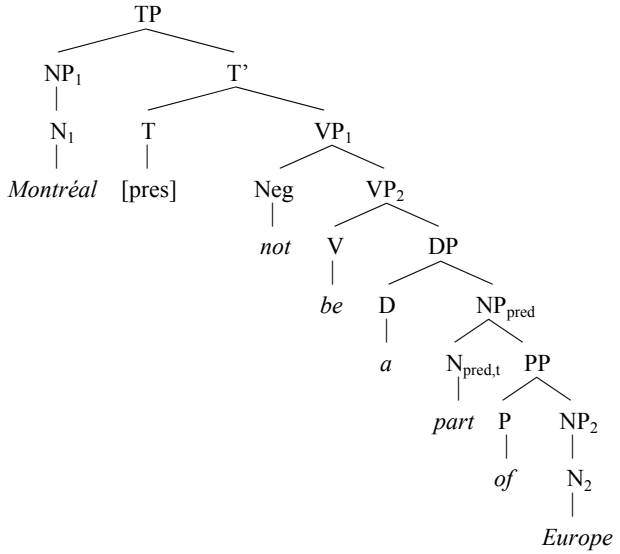
"The notion that individuals are simple, straightforward sorts of things, is a notion that has been known to be simply wrong for a very long time… somehow we may count an infant and a retired fireman as 'the same' individual, even though the infant and the retired fireman have virtually nothing directly observable in common… In our world of people, cities, refrigerators, and plants, under normal circumstances we are not at all struck by the observation that our notion of an individual is really very elusive and abstract…"

"Suppose that [predicates] are ... predicated of *different sorts of things*. Suppose we take an individual, Jake, and look at him as being composed of a set of Jake-stages, or temporally-bounded portions of Jake's existence. There is more to Jake, however, than a set of stages. There is whatever it is that ties all these stages together to make them stages of the same thing. Let us call this whatever-it-is the individual Jake. [Some] predicates… then are not predicated of individuals, but of stages of individuals; and [others] are predicated of the individual, or the thing that ties all the stages together. Now these "stages" can be short or long in duration, but they are nonetheless perceived as parts of a whole. Thus the apparently temporary nature of such predication…"

"A stage is conceived of as being, roughly, a spatially and temporally bounded manifestation of something... An individual, then, is (at least) that whatever-it-is that ties a series of stages together to make them stages of the same thing."

Sample derivations:

(14)



⟦TP⟧ = 1 iff

⟦NP_1⟧ ∈ ⟦T'⟧	(a)
M ∈ ⟦VP_1⟧	(b)x3, (c)
M ∈ ⟦VP_2⟧'	(e), (b), (c)
M ∉ ⟦VP_2⟧	def. '
M ∉ ⟦NP_{pred}⟧	(b)x2
M ∉ {x | <x, ⟦NP_2⟧> ∈ ⟦$N_{pred,t}$⟧}	(f)
M ∉ {x | <x, Europe> ∈ ⟦*part*⟧}	(b)x3, (c)
M ∉ {x | <x, Europe> ∈ {<y, z> | part(y)(z)}}	(c)
M ∉ {x | part(x)(Europe)}	def. ∈

(15) J hid_{refl} and $read_{eod}$.

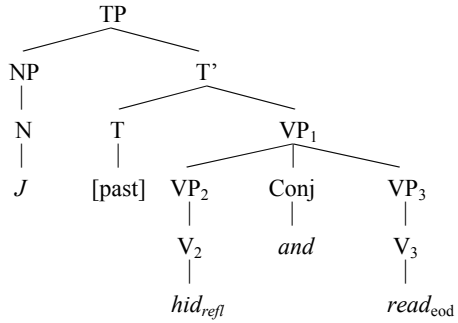
First, solving for hid_{refl} and $read_{eod}$:

⟦$hide_{refl}$⟧ = {x | <x,x> ∈ ⟦*hide*⟧} (iii)
{x | <x,x> ∈ {<y,z> | hide(y)(z)}}
{x | hide(x)(x)}

⟦$read_{eod}$⟧ = {x | {y | <x,y> ∈ ⟦*read*⟧} ≠ ∅} (i)
{x | {y | <x,y> ∈ {<z,m> | read(z)(m)}} ≠ ∅}
{x | {y | read(x)(y)} ≠ ∅}

Next, calculating the truth-conditions for TP:

(16)



⟦TP⟧ = 1 iff

⟦NP⟧ ∈ ⟦T'⟧	(a)
J ∈ ⟦VP_1⟧	(b)x3, (c)
J ∈ ⟦VP_2⟧⟦Conj⟧⟦VP_3⟧	(d)
J ∈ ⟦VP_2⟧ ∩ ⟦VP_3⟧	(d)
J ∈ ⟦hid_{refl}⟧ ∩ ⟦$read_{eod}$⟧	(b)x2
J ∈ {x | hide(x)(x)} ∩ {x | {y | read(x)(y)} ≠ ∅}	see calculation above