Ling 325, Class Grammar. Revised 3/24/05.

A. Inventory of denotations. Let D be the set of all individuals in the actual world. Possible denotations are: Members of D; Subsets of D; Subsets of $D \times D$;[1] Subsets of $Pow(D) \times Pow(D)$, Members of $\{0,1\}$.

B. Lexicon.

Lexical entries:

N: $\|\textbf{Greg}\| = \text{Greg}$, $\|\textbf{Alicea}\| = \text{Alicea}$, …
$\|\textbf{cat}\| = \{x \mid x \text{ is a cat}\}$, $\|\textbf{description}_1\| = \{x \mid x \text{ is a description}\}$, …
$\|\textbf{description}_2\| = \{\langle x,y\rangle \mid x \text{ is a description of } y\}$, …

V: $\|\textbf{smoke}\| = \{x \mid x \text{ smokes}\}$ $\langle \underline{\text{Agent}} \rangle$, $\|\textbf{laugh}\| = \{x \mid x \text{ laughs}\}$ $\langle \underline{\text{Agent}} \rangle$, …

$\|\textbf{close}_1\| = \{\langle x,y\rangle \mid x \text{ closes } y\}$ $\langle \underline{\text{Agent}}, \text{Theme} \rangle$, $\|\textbf{describe}\| = \{\langle x,y\rangle \mid x \text{ governs } y\}$ $\langle \underline{\text{Agent}}, \text{Theme} \rangle$…

$\|\textbf{close}_2\| = \{x \mid x \text{ closes}\}$ $\langle \text{Theme} \rangle$, $\|\textbf{arrive}\| = \{x \mid x \text{ arrives}\}$ $\langle \text{Theme} \rangle$,

$\|\textbf{try}\| = \{\langle x, A\rangle \mid x \text{ tries for } x \in A\}$ $\langle \underline{\text{Agent}} \rangle$, …

A: $\|\textbf{honest}\| = \{x \mid x \text{ is honest}\}$, $\|\textbf{afraid}_1\| = \{x \mid x \text{ is afraid}\}$, …
$\|\textbf{fond}\| = \{\langle x,y\rangle \mid x \text{ is fond of } y\}$, $\|\textbf{afraid}_2\| = \{\langle x,y\rangle \mid x \text{ is afraid of } y\}$, …
*$\|\textbf{eager}\| = \{\langle x,A\rangle \mid x \text{ is eager for } x \in A\}$,
*$\|\textbf{easy}\| = \{\langle x, \mathrm{T}\rangle \mid Gy[\text{it is easy for } \langle y, x\rangle \in \mathrm{T}]\}$, …
(where G is a "generic operator", yet to be defined.)

P: $\|\textbf{outside}\| = \{x \mid x \text{ is outside}\}$, $\|\textbf{inside}\| = \{x \mid x \text{ is inside}\}$, …
$\|\textbf{near}\| = \{\langle x,y\rangle \mid x \text{ is near } y\}$, $\|\textbf{from}\| = \{\langle x,y\rangle \mid x \text{ is from } y\}$, …

Conj: **and**, **or** *Adv*: **not** *I*: **should**, **will**, **can**, **do**, **might**, …

D: $\|\textbf{some}\| = \{\langle A, B\rangle \mid A \cap B \neq \emptyset\}$, $\|\textbf{no}\| = \{\langle A, B \mid A \cap B = \emptyset\}$,
$\|\textbf{every}\| = \{\langle A, B\rangle \mid A \;\; B\}$, $\|\textbf{most}\| = \{\langle A, B\rangle \mid |A \cap B| > |A - B|\}$, etc.

**Lexical rules:*

1. *Passive*. If $\|V_{active}\|$ is a relation between individuals, and has the thematic grid $\langle \underline{\text{Agent}}, \text{Theme}\rangle$, then $\|V_{passive}\| = \{x \mid Ey[\langle y,x\rangle \in \|V_{active}\|]\}$ $\langle \text{Agent}, \text{Theme}\rangle$

2. *Existential object drop* (*Eod*). If $\|V_{trans}\|$ is a relation between individuals, and has the thematic grid $\langle \underline{\text{Agent}}, \text{Theme}\rangle$, then $\|V_{eod}\| = \{x \mid Ey[\langle x,y\rangle \in \|V_{trans}\|]\}$ $\langle \underline{\text{Agent}}, \text{Theme}\rangle$

3. *Reflexive object drop* (*Rod*). If $\|V_{trans}\|$ is a relation between individuals with the thematic grid $\langle \underline{\text{Agent}}, \text{Theme}\rangle$, then $\|V_{rod}\| = \{x \mid \langle x,x\rangle \in \|V_{trans}\|]\}$ $\langle \underline{\text{Agent}}, \text{Theme}\rangle$

Rules 2 and 3 appear to be restricted to certain verbs in the lexicon.

C. Syntactic rules.

Phrase structure rules:

*S → (NP) I VP	VP → V'	V' → V NP	V' → V PP
V' → V AP	V' → V	*V' → V S	VP → VP Conj VP
NP → (D) N'	N' → AP N'	N' → N' PP	N' → N (PP)
PP → P'	P' → P (NP)	AP → A'	A' → A (PP)
*A' → A S	VP → Adv VP	AP → AP Conj AP	PP → PP Conj PP

Movement/Transformations:

1. *V-Raising*. Raise main verb *be* to I.

D. Semantic rules of composition.

1. If α is a non-branching node whose daughter node is β, then $\|\alpha\| = \|\beta\|$.
2. If α is of the form $[_S\ [_{NP}\ N']\ I\ VP]$, then $\|\alpha\| = 1$ iff $\|NP\| \in \|VP\|$.
3. If α is of the form $[_{VP1}\ VP_2\ [_{Conj}\ \text{and}]\ VP_3]$, then $\|\alpha\| = \|VP_2\| \cap \|VP_3\|$.
4. If α is of the form $[_{VP1}\ VP_2\ [_{Conj}\ \text{or}]\ VP_3]$, then $\|\alpha\| = \|VP_2\| \cup \|VP_3\|$.
5. If α is of the form $[_{VP1}\ [_{Adv}\ \text{not}]\ VP_2]$, then $\|\alpha\| = \|VP_2\|^{-}$.
6. If α is of the form $[_{VP}\ [_{V'}\ [_V\ ]\ AP]]$, then $\|\alpha\| = \|AP\|$.
7. If α is of the form $[_{VP}\ [_{V'}\ [_V\ ]\ PP]]$, then $\|\alpha\| = \|PP\|$.
8. If α is of the form $[_{AP1}\ AP_2\ [_{Conj}\ \text{and}]\ AP_3]$, then $\|\alpha\| = \|AP_2\| \cap \|AP_3\|$.
9. If α is of the form $[_{AP1}\ AP_2\ [_{Conj}\ \text{or}]\ AP_3]$, then $\|\alpha\| = \|AP_2\| \cup \|AP_3\|$.
10. If α is of the form $[_{X'}\ X\ YP]$, then $\|\alpha\| = \{x \mid \langle x, \|YP\|\rangle \in \|X\|\}$.[2]
11. If α is of the form $[_S\ [_{NP}\ Det\ N']\ I\ VP]$, then $\|\alpha\| = 1$ iff $\langle \|N'\|, \|VP\|\rangle \in \|D\|$.
12. If α is of the form $[_{N'}\ AP\ N']$ then $\|\alpha\| = \|AP\| \cap \|N'\|$.
13. If α is of the form $[_{N'}\ N'\ PP]$, then $\|\alpha\| = \|N'\| \cap \|PP\|$.

*14. If α is of the form $[_S\ I\ VP]$, then $\|\alpha\| = \|VP\|$.

[1] $D \times D$ ("the *Cartesian product* of D with D") is defined as $\{\langle x, y\rangle \mid x \in D \text{ and } y \in D\}$, which is the set of all ordered pairs of elements of D.

[2] If YP is of the form $[_{PP}\ [_{P'}\ [_P\ \textit{of}]\ NP],]$ then the denotation of $\|YP\| = \|NP\|$.