

(i) Lexicon

(a) *Lexical items:*

- PrN: $[[Laure]]^s = \text{Laure}, \dots$
 N_i: $[[girl]]^s = \{x \mid x \text{ is a girl in } s\}, \dots$
 N_i: $[[governor]]^s = \{\langle x, y \rangle \mid x \text{ is a governor of } y \text{ in } s\}, \dots$
 V_i: $[[laugh]]^s = \{x \mid x \text{ laughs in } s\}, \dots$
 V_t: $[[save]]^s = \{\langle x, y \rangle \mid x \text{ saves } y \text{ in } s\}, \dots$
 A_i: $[[brave]]^s = \{x \mid x \text{ is brave in } s\}, \dots$
 A_t: $[[fond]]^s = \{\langle x, y \rangle \mid x \text{ is fond of } y \text{ in } s\}, \dots$
 P_i: $[[out]]^s = \{\langle x, y \rangle \mid x \text{ is out in } s\}, \dots$
 P_t: $[[behind]]^s = \{\langle x, y \rangle \mid x \text{ is behind } y \text{ in } s\}, \dots$
 Conj: $[[and]]^s = \cap, [[or]]^s = \cup$
 Neg: $[[not]]^s = '$
 D: $[[every]]^s = \{\langle A, B \rangle \mid A \subseteq B\}, [[some]]^s = \{\langle A, B \rangle \mid A \cap B \neq \emptyset\}$
 $[[no]]^s = \{\langle A, B \rangle \mid A \cap B = \emptyset\}$
 D_c: a T: be
Note: The following are semantically vacuous: Main V *be*; the P *of*; the D *a*.

(b) *Lexical rules:*

Existential object drop (eod).

If V is a relation, $[[V_{eod}]]^s = \{x \mid \exists y[\langle x, y \rangle \in [[V]]^s\}$.

Condition: Only applies to certain verbs in the lexicon: *eat, bake, read...*

Reflexive object drop (refl).

If V is a relation, $[[V_{refl}]]^s = \{x \mid \langle x, x \rangle \in [[V]]^s\}$.

Condition: Only applies to certain verbs in the lexicon: *shave, hid, undress...*

Passive (pass).

If V is a relation, $[[V_{pass}]]^s = \{x \mid \exists y[\langle y, x \rangle \in [[V]]^s\}$.

(ii) Syntactic rules

(a) *Phrase Structure rules:*

- S → DP (T) VP
 DP → D NP
 PrN
 NP → N_i
 N_t PP
 NP PP
 AP PP
 VP → V_i
 V_t DP
 V_c {AP/PP/DP}
 AP → A_i
 A_t PP
 PP → P_i
 P_t DP
 XP → XP Conj XP where X ∈ {V, A, P, N, D}
 XP → Neg XP where X ∈ {V, A, P, D}

PrN → *Laure, ...*

N_i → *guy, ...*

N_t → *governor...*

V_i → *laugh, ...*

V_t → *save, ...*

A_i → *brave...*

A_t → *fond, ...*

P_i → *out, ...*

P_t → *behind...*

Neg → *not*

V_c → *be*

D → *every, some, no*

D_c → *a*

T → *be*

(b) *Transformations:*

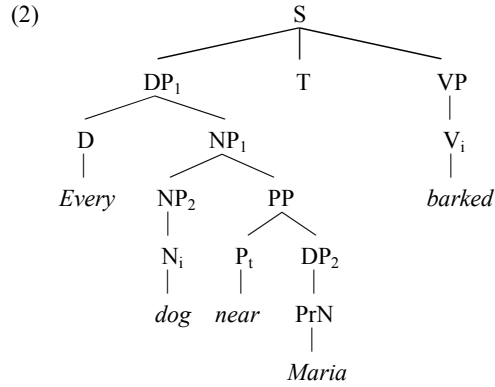
V-to-T Movement: Raise main verb *be* to T, if T is empty.

(iii) Semantic rules of composition. For any situation s ,

- (a) $\llbracket [_S \text{ DP T VP}] \rrbracket^s = 1$ iff $\llbracket \text{VP} \rrbracket^s \in \llbracket \text{DP} \rrbracket^s$
- (b) If α is a non-branching node whose daughter node is β , $\llbracket \alpha \rrbracket^s = \llbracket \beta \rrbracket^s$.
- (c) If α is a terminal node, $\llbracket \alpha \rrbracket^s$ is specified in the lexicon.
- (d) $\llbracket [_{XP_1} \text{ XP}_2 \text{ Conj XP}_3] \rrbracket^s = \llbracket \text{XP}_2 \rrbracket^s \llbracket \text{Conj} \rrbracket^s \llbracket \text{XP}_3 \rrbracket^s$.
- (e) $\llbracket [_{XP_1} \text{ Neg XP}_2] \rrbracket^s = (\llbracket \text{XP}_2 \rrbracket^s) \llbracket \text{Neg} \rrbracket^s$
- (f) $\llbracket [_{YP} \text{ Y}_1 \text{ ZP}] \rrbracket^s = \{x \mid \langle x, \llbracket \text{ZP} \rrbracket^s \rangle \in \llbracket \text{Y}_1 \rrbracket^s\}$
- (g) $\llbracket [_{DP} \text{ D NP}] \rrbracket^s = \{A \mid \langle \llbracket \text{NP} \rrbracket^s, A \rangle \in \llbracket \text{D} \rrbracket^s\}$
- (h) $\llbracket [_{DP} \text{ PrN}] \rrbracket^s = \{A \mid \llbracket \text{PrN} \rrbracket^s \in A\}$
- (i) $\llbracket [_{NP_1} \text{ NP}_2 \text{ PP}] \rrbracket^s = \llbracket \text{NP}_2 \rrbracket^s \cap \llbracket \text{PP} \rrbracket^s$
- (j) $\llbracket [_{NP_1} \text{ AP NP}_2] \rrbracket^s = \llbracket \text{AP} \rrbracket^s \cap \llbracket \text{NP}_2 \rrbracket^s$

2. Example Derivation

(1) Every dog near Maria barked.



(3) For any s , $[[S]]^s = 1$ iff

$$[[VP]]^s \in [[DP_1]]^s \quad (a)$$

$$[[VP]]^s \in \{A \mid \langle [NP_1]^s, A \rangle \in [[D]]^s\} \quad (g)$$

$$\langle [NP_1]^s, [VP]^s \rangle \in [[D]]^s \quad \in$$

$$\langle [NP_1]^s, [VP]^s \rangle \in [[every]]^s \quad (b)$$

$$\langle [NP_1]^s, [VP]^s \rangle \in \{\langle B, C \rangle \mid B \subseteq C\} \quad (c)$$

$$[[NP_1]]^s \subseteq [[VP]]^s \quad \in$$

$$([NP_2]^s \cap [PP]^s) \subseteq [VP]^s \quad (i)$$

$$([N_i]^s \cap [PP]^s) \subseteq [VP]^s \quad (b)$$

$$([dog]^s \cap [PP]^s) \subseteq [VP]^s \quad (b)$$

$$([dog]^s \cap \{x \mid \langle x, [DP_2]^s \rangle \in [P_t]^s\}) \subseteq [VP]^s \quad (f)$$

$$([dog]^s \cap \{x \mid \langle x, [PrN]^s \rangle \in [P_t]^s\}) \subseteq [VP]^s \quad (b)$$

$$([dog]^s \cap \{x \mid \langle x, [Maria]^s \rangle \in [P_t]^s\}) \subseteq [VP]^s \quad (b)$$

$$([dog]^s \cap \{x \mid \langle x, Maria \rangle \in [P_t]^s\}) \subseteq [VP]^s \quad (c)$$

$$([dog]^s \cap \{x \mid \langle x, Maria \rangle \in [near]^s\}) \subseteq [VP]^s \quad (b)$$

$$([dog]^s \cap \{x \mid \langle x, Maria \rangle \in \{\langle y, z \rangle \mid y \text{ is near } z \text{ in } s\}\}) \subseteq [VP]^s \quad (c)$$

$$([dog]^s \cap \{x \mid x \text{ is near Maria in } s\}) \subseteq [VP]^s \quad \in$$

$$(\{x \mid x \text{ is a dog in } s\} \cap \{x \mid x \text{ is near Maria in } s\}) \subseteq [VP]^s \quad (c)$$

$$\{x \mid x \text{ is a dog in } s \text{ and } x \text{ is near Maria in } s\} \subseteq [VP]^s \quad \cap$$

$$\{x \mid x \text{ is a dog in } s \text{ and } x \text{ is near Maria in } s\} \subseteq [[V_i]]^s \quad (b)$$

$$\{x \mid x \text{ is a dog in } s \text{ and } x \text{ is near Maria in } s\} \subseteq [[barked]]^s \quad (b)$$

$$\{x \mid x \text{ is a dog in } s \text{ and } x \text{ is near Maria in } s\} \subseteq \{x \mid x \text{ barked in } s\} \quad (c)$$