Cognitive Grammar: Some Preliminary Speculations
George Lakoff, UC Berkeley

Disclaimer: Since the purpose of this paper is to present some sketchy ideas and get them criticized as soon as possible, the contents may be expected to self-destruct within a week or less.

1. a. crossing
   I = C(1,2);  II = C(2,1);  III = P(1,2)
   a. \( P_L/I \supset (P_S/I \land II \supset P_S/III) \)
   b. \( P_S/I \land II \land III \supset P_L/I \)
   c. \( P_S/I \land II \supset (P_S/III \Leftrightarrow P_L/I) \)

2. Woods' 'guessing' idea

<table>
<thead>
<tr>
<th>JOHN</th>
<th>WAS</th>
<th>BELIEVED</th>
<th>TO</th>
<th>HAVE BEEN</th>
<th>SHOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>John is subject</td>
<td>John is object</td>
<td>Someone is object</td>
<td>John is lower speech</td>
<td>John is lower object</td>
<td>Someone is lower object</td>
</tr>
</tbody>
</table>

3. a. Stanley and Marvin came in in that order.
   Harry is a bastard in both senses of the word.
   c. Sheriff Clark is a pig in every sense of the word.
   d. Mary reported that Susie was surprised when their respective husbands,
      Harry and Max, got arrested.
   e. Mimi married a prince, figuratively speaking of course.
   f. Sam looked up Mary's dress -- I mean, her address.
   g. Northern liberals are proud of their racial, or rather racist attitudes.
   h. They call him 'Fate', even though he's not.
   i. Harry's wife -- if he has one -- must be a ninny.

4. a. John believes to be a spy - the man with the dark glasses and the trenchcoat.
   b. 'John want to leave - the man with the dark glasses and the trenchcoat.
   c. ?It's Max who Sam says John expects to shave himself.

5. Derivations:

<table>
<thead>
<tr>
<th>Semantics</th>
<th>Possibly changed or incremented semantics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computation space</td>
<td>New computation space</td>
</tr>
<tr>
<td>Surface string</td>
<td>Possibly bigger surface string</td>
</tr>
</tbody>
</table>

   etc. etc.
Production Derivations

Semantic Info Gradually Increasing Throughout Derivation

Computation Space Incremented by Semantic Info

Surface String

Recognition Derivations

Semantic Guesses

Computation Space

Surface String

Production Rules:

Relevant Semantic Info as syntactically processed to date

Relevant Surface String info so far

New Conditions on GR's to be met

Conditions to be met by future surface string

Recognition Rules

Condition on Semantic guesses so far

New Semantic guesses

Condition on computation so far, including element under consideration

Conditions on future computations
List of Functional Elements: TR, AE, D, SS

1. Conditions met by both 'Input' and 'Output'

2. 'Input' Conditions (I)
   - a. GR's
   - b. Surface constraints

3. 'Output' Conditions (II)
   - a. GR's
   - b. Surface constraints

Production Rule: AE is replaced by *

<table>
<thead>
<tr>
<th></th>
<th>3a</th>
<th>3a'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2a</td>
<td>2a'</td>
</tr>
<tr>
<td></td>
<td>2b</td>
<td>2b'</td>
</tr>
</tbody>
</table>

Recognition Rule: SS is replaced by *

<table>
<thead>
<tr>
<th></th>
<th>3b</th>
<th>3b'</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3a</td>
<td>2a</td>
</tr>
<tr>
<td></td>
<td>3b</td>
<td>3b'</td>
</tr>
</tbody>
</table>
**DATIVE**

**ABSTRACT**

**TR**: 2

**AE**: 1

**SS**: 3

I<sub>a</sub>: 10(1,2) [DO(3,2)]

II<sub>a</sub>, DO(1,2)

1. TIP(P,3) [CH(1,2)]

---

**PRODUCTION**

<table>
<thead>
<tr>
<th>10 (*, 2)</th>
<th>DO(*, 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D0(3, 2)</td>
<td>TIP(3, 3)</td>
</tr>
<tr>
<td></td>
<td>CH(1,2)</td>
</tr>
</tbody>
</table>

---

**RECOGNITION**

<table>
<thead>
<tr>
<th>DO(1,2)</th>
<th>DO(*,2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH(*,2)</td>
<td>10(1,2)</td>
</tr>
<tr>
<td>TIP(P,*)</td>
<td></td>
</tr>
</tbody>
</table>

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**PASSIVE**

**ABSTRACT**

**TR**: 1

**AE**: 2

**SS**: 1

I<sub>a</sub>: DO(2,1) [S(3,1)]

II<sub>a</sub>: S(2,1)

b. PaP(1) [CH(3,1)]

IP(BE,1)

---

**PRODUCTION**

<table>
<thead>
<tr>
<th>DO(*,1)</th>
<th>S(*,1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S(2,1)</td>
<td>CH(2,1)</td>
</tr>
<tr>
<td></td>
<td>PaP(1)</td>
</tr>
<tr>
<td></td>
<td>IP(BE,1)</td>
</tr>
</tbody>
</table>

---

**RECOGNITION**

<table>
<thead>
<tr>
<th>S(2,*)</th>
<th>DO(2,*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PaP(*)</td>
<td>CH(3,*)</td>
</tr>
<tr>
<td>IP(BE,*)</td>
<td></td>
</tr>
</tbody>
</table>
RAISING INTO OBJECT

ABSTRACT

TR: 4
AE: 1
SS: 2

COND: COMP(2, 4)

I_a: SUBJ(1, 2) [OBJ(2, 4)]

II_a: OBJ(1, 4) [-[(∃x)SUBJ(x, 2)]
       1. FINITE(2) [CH(2, 4)]

PRODUCTION

COMP(2, 4) | OBJ(*, 4)  
SUBJ(*, 2) | (∃x)SUBJ(x, 2)  
OBJ(2, 4) | CH(2, 4)  
           | FINITE(2)

RECOGNITION

COMP(*, 4) | SUBJ(1, *)
1(∃x)SUBJ(x, *) | OBJ(*, 4)
OBJ(1, 4) | FINITE(*)
CH(*, 4)

EQUI FROM SUBJ

ABSTRACT

TR: 4
AE: 1
SS: 2

COND: COMP(2, 4)

I_a: SUBJ(1, 2)

II_a: OBJ(1, 4) [-(∃x)SUBJ(x, 2)]
       1. FINITE(2)

PRODUCTION

SUBJ(3, 4) | (∀x)SUBJ(x, 2)  
SUBJ(*, 2) | (∃x)SUBJ(x, 2)  
OBJ(*, 4) | COREF(*, 3)  
           | FINITE(2)

RECOGNITION

COMP(*, 4) | COREF(1, 3)
SUBJ(3, 4) | SUBJ(1, *)
-(∃x)SUBJ(x, *) | FINITE(*)

**RELATIVE CLAUSE FORMATION**

**ABSTRACT**

TR: 3  
D: 2  
AE: 1  
SS: 1

I_a: \( Y(1, z) \)
     \[ MOD(2, 3) \]
     \[ COREF(1, 3) \]

II_b: \( wh(1) \)
      \( IP(3, 1) \)

**PRODUCTION**

\[ Y(\ast, z) \]
\[ MOD(2, 3) \]
\[ COREF(\ast, 3) \]

\[ wh(\ast) \]
\[ IP(3, \ast) \]

**RECOGNITION**

\[ Y(\ast, z) \]
\[ MOD(2, 3) \]
\[ COREF(\ast, 3) \]

\[ wh(\ast) \]
\[ IP(3, \ast) \]