Approaches to Phrase Structure

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From sound to meaning ... via structure

(1) a. Phrases are “real”.
   b. Conceptual necessity: (2)
   c. Some preliminary evidence: (3)–(13)

Humboldt’s Paradox:

(2) Language makes “infinite use of finite means”—thus the need for some machinery with recursive power (cf. Gary Marcus’s *The Algebraic Mind*).

English vs. Japanese

(3) [S John-ga [VP Mary-ni [NP kono hon]-o age] ta]  
   John-NOM Mary-DAT that book-ACC given has  
   “John has [VP given [NP that book] to Mary]”

(4) Mary-ga [NP kono [PP Nihon kara(-no)] kagaku no gakusei]-o korosi ta  
   Mary-NOM that Japan from chemistry of student-ACC killed PAST  
   “Mary killed that student of chemistry [PP from Japan]”

(5) John-ga [PP Paris kara] [PP New-York e] it ta  
   John-NOM Paris from New-York to went PAST  
   “John went [PP from Paris] [PP to New York]”

(6) ondo-ga [PP hotondo nanadyuu do made] agat ta  
   temperature-NOM almost 70 degrees to rise PAST  
   “The temperature rose [PP almost to 70 degrees]”

(7) Mary-ga [CP [IP John-ga hon-o yonda] to] omottei ru  
   Mary-NOM John-NOM book-ACC read that think PRESENT  
   “Mary thinks [CP that [PP John read the book]]”

(8) In (3)–(7), the group of words that often follows a V, Aux, P, A, C in English precedes this V, Aux, P, A, C in Japanese.

Anaphora:

(9) a. *John decided on the boat*  [ambiguous]  
    b. *John decided on the boat, and Mary did so on the airplane.* [unambiguous]
(10) a.  *John put the book on the table on Tuesday, and Mary did so on Wednesday.*

b.  *... and Mary did so on the desk on Wednesday.*

C-command:

(11) a.  *John hit himself*

b.  *A sister of John’s hit himself*

Order and-vs. structure vis-à-vis interpretation:

(12) a.  *John carefully quickly knocked on the door*

b.  *John quickly carefully knocked on the door*

(13) a.  *John knocked on the door carefully quickly*

b.  *John knocked on the door quickly carefully*

**From words to phrases? Where does structure come from?**

**From phrase-structure rules (Chomsky 1965)?**

(14)  

\[ S \rightarrow \text{NP \ VP} \]

\[ \text{NP} \rightarrow \text{Det \ N} \]

\[ \text{VP} \rightarrow \text{V} \]

\[ \text{VP} \rightarrow \text{V \ NP} \]

\[ \text{VP} \rightarrow \text{V \ PP} \]

[...]

**Problems:**

(15) a.  *PS-rules are too strong and too unconstrained (why not, say, NP \rightarrow S \ VP ?) — Actually what does “VP \rightarrow V ...” mean?*

b.  *PS-rules are also too weak— how to account for, e.g., the following selection requirements: \textit{depend} \text{\_\_PP on ...}, \textit{rely} \text{\_\_PP on ...}, \textit{recon} \text{\_\_PP with ...}, \textit{participate} \text{\_\_PP in ...}, \textit{provide} \text{\_\_PP with ...}, etc.)*

c.  *PS-rules are not explanatory adequate—not enough restriction on language learner’s search space.*

d.  *PS-rules do not capture certain structural generalizations (e.g., between the structures projected by \textit{destroy} and \textit{destruction}).*

e.  *PS-rules are somewhat redundant (e.g., they duplicate certain lexical information such as subcategorization properties of verbs).*
From PS rules to X'-Theory (Chomsky 1970ff)

X-bar schemata:

(16) \[
    X' = X^0 / X' \quad Y'' \\
    X'' = X' / X'' \quad Z''
\]

X-bar constraints (verbose):

(17) a. Endocentricity: Every phrase (e.g., $X''$ in (16)) has exactly one head ($X^0$ in (16)).
    b. Projection never decreases “bar” level (i.e., $X^n$ is never dominated by $X^m$ where $m < n$)
    c. “Specifiers”, “complements” and “adjuncts” (outside of head-movement structures) are maximal projections ($Y''$ and $Z''$ in (16)).

Nota Bene:

(18) a. In the X-bar system, “specifier”, “complement” and “adjunct” are derivative notions. At first approximation:

  “**Complement**”: $Y''$ sister to $X^0$

  “**Specifier**”: $Z''$ dominated by $X''$ and sister to $X'$

  “**Adjunct**: $Z''$ dominated by $X''$ and sister to $X''$; or $Y''$ dominated by $X'$ and sister to $X'$

b. The X-bar schema does not specify linear precedence. The latter is to be fixed on a language-by-language basis by the “head parameter” (English: head-initial, spec-initial; Japanese: head-final, spec-initial). But see Kayne 1994.

X-bar projection entails feature sharing:

(19) Features of the head $X^0$ percolate up the projection to $X''$. Thus $X^0$’s features are visible to the head that takes $X''$ as complement (see (20))

(20) a. **They relied on** their goal-keeper
    b. **They have given** their fortune to charities
    c. **They expect that** Mary **will win**
    d. **They expect for** Mary **to win**
    e. **They arranged for** him **to win** the race
    f. **They wonder if** you **will win**
(21)  “Phrase structure composition is driven by feature discharge”

(22)  a. Lexical categories = \{ categorical features, theta-features, subcategorization features, phonological features, etc. \}

b. Functional categories = \{ categorical features, agreement features, subcategorization features, phonological features, etc. \}

(23)  a. The projections of a lexical head \( L^0 \) are recursively iterable \( L' \). These projections are driven by the discharge of, e.g., theta-features and subcategorization features.

b. The projections of a functional head \( F^0 \) are: (i) a non-iterable \( F' \) (this projection is driven by the discharge of \( F^0 \')s unique subcategorization feature onto the complement of \( F^0 \); and (ii) possibly a closed/non-iterable \( F'' \) (this projection is driven by the discharge of a unique agreement feature onto a maximal projection that moves into the forceably unique Spec position).

Therefore, any functional head \( F^0 \) has a unique complement (sister to \( F^0 \) and dominated by \( F' \)) and at most one specifier (sister to \( F' \) and dominated by \( F'' \)) and that specifier “agrees” with \( F^0 \) and closes off the \( F'' \) projection. The element in specifier position is always moved from within the complement of \( F^0 \).

(24)  Agreement features of functional categories as the driving force for movement in syntax (e.g., in NP-movement, \( wh \)-movement and verb-movement).

How to recognize functional items?

(25)  a. Functional items are closed class items (Fukui & Speas 1986, Abney 1986)

b. “Functional elements lack … ‘descriptive content’. Their semantic contribution is second-order, regulating or contributing to the interpretation of their complement. They mark grammatical or relational features, rather than picking out a class of objects.” (Abney 1987:65)

For example, functional morphemes in the nominal domain “specify the reference of a noun phrase. The noun provides a predicate, and the determiner picks out a particular member of that predicate’s extension.” (Abney 1987:76f)

c. Functional morphemes have “logical”/“relational” (i.e., permutation-invariant) semantics; “logicality means insensitivity to specific facts about the world … a purely mathematical relationship …” (von Fintel 1995:179)
Unifying DP-analysis and Predicate-Internal Subject Hypothesis

(26) a. The enemy destroyed the city
   b. The city was destroyed (by the enemy)

(27) a. The enemy’s destruction of the city
   b. The city’s destruction (by the enemy)

(28) a. All the boys must have been singing Ave Maria
   b. (All) The boys (all) must (all) have (all) been (all) singing Ave Maria

(29) a. Tous les garçons ont chanté l’Ave Maria
   b. Les garçons ont tous chanté l’Ave Maria

(30) a. Toutes les filles ont chanté l’Ave Maria
   b. Les filles ont toutes chanté l’Ave Maria

Relativized X’-Theory and cross-linguistic parametrization (Fukui & Speas 1986)

English DPs vs. Japanese N’

(31) John-no kon-no hon
   “John’s this book” (literally)

(32) a. Did you meet with Taro yesterday”
   b. Un, demo kinoo-no kare sukosi yoosu-ga hendat -ta
   yes, but yesterday-GEN he-TOP somewhat state-NOM be strange PAST
   “Yes, but yesterday’s he was somewhat strange”

English IPs vs. Japanese V’

(33) burmeikoko-ga dansei-ga heikin-zyumyoo-ga mizikai
   civilized countries-NOM male-NOM average-lifespan-NOM is short
   “It is civilized countries that men, their average lifespan is short in”

Cross-linguistic variation in Fukui & Saito’s (1998) Parametrized Merge

Chomsky’s (1995) Merge:

(34) \( K = \{\gamma, \{\alpha, \beta\}\} \)

Fukui & Saito’s (1998) Parametrized Merge

(35) \( K = \{\gamma, < \alpha, \beta > \} \) where \( \gamma \in \{\alpha, \beta\} \)
   a. \( \gamma = \alpha \): head-initial, left-headed (e.g., English)
b. \( \gamma = \beta \): head-final, right-headed (e.g., Japanese)

(36) a. In head-initial languages (e.g., English), “\textsc{Merge}” always puts maximal projections (e.g., to the right of the target \( \alpha \), which in turn projects as a distinct node \( \alpha' \).

Maximal projections to the left of the target (e.g., English subjects to the left of \( I^0 \) and \( \text{wh} \)-phrases to the left of \( C^0 \)) are “\textsc{Adj}ioned” (not “Merged”) and the target \( \alpha \) (e.g., \( I' \) and \( C' \) respectively) does not project. Instead, Adjunction creates a single node with two segments (say, \( \alpha_1 \) and \( \alpha_2 \)).

b. In head-final languages (e.g., Japanese), “\textsc{Merge}” always puts maximal projections to the left of the target \( \alpha \), which in turn projects as a distinct node \( \alpha' \). This is the case, for example, with Japanese subjects to the left of \( I^0 \) and with phrases that scramble to the left of \( C^0 \).

Maximal projections to the right of the target are “\textsc{Adj}ioned” (not “Merged”) and the target \( \alpha \) does not project. Instead, Adjunction creates a node with two segments (say, \( \alpha_1 \) and \( \alpha_2 \)).

(37) a. (True) “\textsc{Merge}” (when the target projects) comes for free while “\textsc{Adj}unction” (when the target does not project) is a last-resort operation, driven by feature discharge.

b. “\textsc{Adj}unction” to adjoined phrases is excluded.

(38) burmeikoko-ga dansei-ga heikin-zyumyoo-ga mizikai civilized countries-NOM male-NOM average-lifespan-NOM is short “It is civilized countries that men, their average lifespan is short in”

(39) a. ?* Who did [a picture of \( t_i \)] please John?

b. ?* Who did John go home [because he saw \( t_i \)]?