

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 [IP 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 → NP VP
 NP → Det N
 VP → V
 VP → V NP
 VP → V PP
 [...]

Problems:

- (15) a. PS-rules are too strong and too unconstrained (why not, say, NP → S VP ?) —
 Actually what does “VP → V ...” mean?
 b. PS-rules are also too weak— how to account for, e.g., the following selection requirements: *depend* [PP on ...], *rely* [PP on ...], *reckon* [PP with ...], *participate* [PP in ...], *provide* [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 *destroy* and *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:

$$(16) \quad \begin{array}{l} X' = X^0/X' \ Y'' \\ X'' = X'/X'' \ Z'' \end{array}$$

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*

Relativized X'-Theory (Fukui & Speas 1986, Fukui 2001)

- (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 Stechow 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) $K = \{\gamma, \langle \alpha, \beta \rangle\}$ 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), “MERGE” always puts maximal projections (e.g., to the right of the target α , which in turn projects as a distinct node α').

Maximal projections to the left of the target (e.g., English subjects to the left of I^0 and *wh*-phrases to the left of C^0) are “ADJOINED” (not “Merged”) and the target α (e.g., I' and C' respectively) does not project. Instead, Adjunction creates a single node with two segments (say, α_1 and α_2).

- b. In head-final languages (e.g., Japanese), “MERGE” always puts maximal projections to the left of the target α , which in turn projects as a distinct node α' . 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 “ADJOINED” (not “Merged”) and the target α does not project. Instead, Adjunction creates a node with two segments (say, α_1 and α_2).

- (37) a. (True) “MERGE” (when the target projects) comes for free while “ADJUNCTION” (when the target does not project) is a last-resort operation, driven by feature discharge.

b. “ADJUNCTION” 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_i did [a picture of t_i] please John?*
b. ?* *Who_i did John go home [because he saw t_i]?*