Grammatical-function (GF) 'changes' in Lexical-Functional Grammar (LFG)

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Overview

Principles & Parameters (P&P)

(1) a. Grammatical functions (GFs) can be read off structural representations—notions such as "subject" and "object" are parasitic on phrase-structure.

b. Uniformity of Theta-Assignment Hypothesis (UTAH): Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure (i.e. θ-roles are uniformly projected in the syntax).

R(elativized)UTAH: Only the relative positions of the θ-roles matter (e.g., always project theme above goal, independently of actual positions of theme and goal).

c. GFs and changes therein (in, e.g, passives and unaccusatives) can be recovered from (the derivational history of) phrase markers. P&P is a multi-stratal theory.

d. Semantics is strongly compositional, thus the necessity of (e.g.) a VP node, even in (apparently) VSO languages such as Irish and even in non-configurational languages such a Walpiri.

Relational Grammar (RG)

(2) a. Unlike in P&P, GFs are primitive—*independent* of phrase-structure. Notions like subject are object are "first-class citizens".

b. RG is a system of laws that regulate the mapping from lexical semantics to GFs, including laws that govern permutations among GF-patterns. Like P&P, RG is a multi-stratal theory.

c. Universal Alignment Hypothesis (UAH): Initial grammatical relations systematically correlate with semantic roles (Perlmutter & Postal 1984:97); cf. (R)UTAH in P&P.

Lexical-Functional Grammar (LFG)

(3) a. "[LFG] choose[s] a more abstract representation of the grammatical functions subject and object, one which is neutral between the differing modes of expression of languages. On this alternative, grammatical functions are not reducible to phrase structure configurations ... They are classes of differing formal expressions that are mapped into argument structure in equivalent ways." (Bresnan 2000:9)

b. "External structure" (= c[onstituent]-structure) is variable whereas "internal structure" (= f[unctional]-structure) is invariant.

To wit: both English IP $\mapsto$ NP INFL VP and Walpiri S $\mapsto$ X (Aux) X* (no VP!) are directly associated—without transformations—with a Pred<Subj,Obj> f-structure—no universal X-bar theory, no LCA, no "configurational bias" ("some [languages] make breathtakingly little use of [constituent structure], compared to English" (Bresnan 2000:46).

c. E.g., common f-structure for English *The small children are chasing the dog* and Walpiri *Kurdujarrarlu kapala maliiki wajilipinyi witajarrrarlu* :
children PRES dog chase small

$$\begin{bmatrix} PRED & \text{`}chase\text{'} & \\ SUBJ & \begin{bmatrix} PRED & \text{`}children\text{'} & \\ DEF & \text{`}+\text{'} & \\ NUM & PL & \\ MODS & \{[PRED & \text{`}small\text{'}]\} \end{bmatrix} \\ OBJ & \begin{bmatrix} PRED & \text{`}dog\text{'} \\ DEF & \text{`}+\text{'} \end{bmatrix} \end{bmatrix}$$

d. No (R)UTAH, no UAH.

> "The underspecified [thematic] roles are freely mapped onto all compatible grammatical functions subject to a few general constraints ..." (Bresnan & Zaenen 1990).

In other words, any given thematic-role can be mapped to more than one grammatical function—the mapping from argument structure to GFs is underspecified, by necessity given design features.

e. Unlike P&P and RG, LFG is mono-stratal, again by design.

LFG's design features

(4) a. MONOTONICITY: a *computational* constraint on the 'derivation' of feature structures representing the grammatical relations of the string being parsed.

> "[A]s the length of any string increases, so does the information contained in the [functional] structures(s) assigned to that string accord ing to the rules of [grammar] G" (Bresnan 1990:1).

Thus, LFG entertains no grammatical-relation changes (e.g., nothing like A-movement) in the syntax. These are not information preserving, thus they conflict with monotonicity:

> [Grammatical] "relation changes necessarily replace the syntactic attributes

> of arguments (as the passive replaces an object by a subject, for example)" (ibid).

In LFG, GF changes are "precompiled" in the lexicon via morpholexical rules that apply to argument structures and produce new argument structures. This is a *lexicalist* model.

b. FACTORIZATION: Generalizations are expressed on a set of mutually-constraining parallel representations with distinct primitives and distinct geometry.

> "Thematic structure [a-structure], constituent structure [c-structure] and functional structure [f-structure] are parallel information structures of very different formal character. They are related not by proof theoretic derivation but by local structural correspondences, as a melody is related to words of a song" (Bresnan & Kanerva 1989:1).

LFG's basic ontology—declarative constraints on parallel structures with distinct vocabularies and distinct geometry

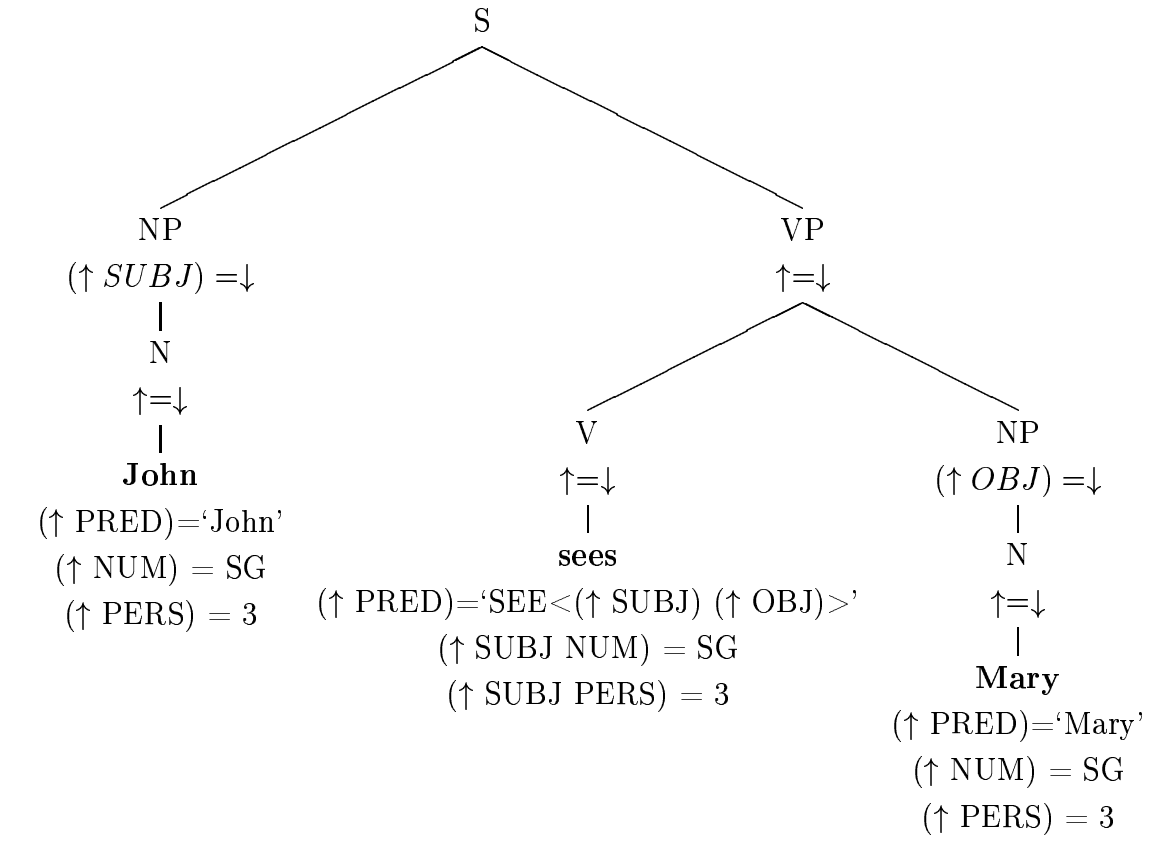
(5) a. F[UNCTIONAL]-STRUCTURE: A mathematical function denoting a finite network of abstract information on grammatical-relations within an utterance (= DS – (R)UTAH?) (see (3c)).

b. C[ONSTITUENT]-STRUCTURE: A phrase-structure tree with Immediate Dominance (ID) and Linear Precedence (LP) statements and with functional-description equations. This is a parse tree for the *surface* string (the PF?) of the utterance—no phonetically-null nodes allowed (thus, no traces, no movement, no "initial" underlying syntactic representation). The equations ensure the sharing of information, via unification, across the feature-structures associated with nodes in the tree.

c. Correspondence rules between c-structure and f-structure: C-structure is constrained by context-free rules annotated with functional-description equations (i.e., equations that link pieces of c-structure with pieces of f-structure).

S $\mapsto$	NP		VP
	$(\uparrow \text{SUBJ}) = \downarrow$		$\uparrow = \downarrow$

d.



e. Well-formedness conditions on f-structures:

Functional Uniqueness: In any given f-structure, a particular attribute may have at most one value (i.e., f-structures are mathematical functions).

Completeness: An f-structure is *locally complete* if and only if it is defined for all the grammatical functions that its predicate governs. An f-structure is *complete* if and only if it and all its subsidiary f-structures are locally complete.

In other words, every GF mentioned by some PRED must be defined in the f-structure of that PRED, and recursively so.

Coherence: An f-structure is *locally coherent* if and only if all the governable grammatical functions that it contains are governed by a local predicate. An f-structure is *coherent* if an only if it and all its subsidiary features f-structures are locally coherent.

In other words, every GF in an f-structure must match up with some GF in the PRED of that f-structure, and recursively so.

Together, Completeness and Coherence are equivalent to the θ-criterion in P&P.

Lexicon, a-structures and f-structures

(6) a. Lexical items contribute most of the functional information in the final f-structure.

b. Predicators (e.g., verbs) in the lexicon project a[rgument]-structures.

c. A-structures represent "the grammatically significant participant-roles in the structure of events" (Bresnan 1990:6), "the minimal lexical information needed for the projection of semantic roles onto surface syntactic functions" (ibid:9).

d. The a-structures of predicator maps to GFs in f-structures, which in turn are in a correspondence relation (whose character is language-particular) with c-structure (see (5c)).

e. How do we know which θ-roles in the a-structure are associated with which grammatical functions? Answer: A distinct system (Lexical Mapping Theory) maps a-structure to f-structure. A-structures project (skeletal) f-structures via the Lexical Mapping Theory in (7ff).

f. Morpholexical operations on a-structures (e.g., "suppression" as in passives; see (14)) expand the lexical stock of a-structures.

The Lexical Mapping Theory (LMT): Projecting θ roles in a-structures to (partially specified) GFs in f-structures

(7) Basic components of LMT:

a. Thematic hierarchy and a-structure
b. Morpholexical operations on a-structures (e.g, "suppression" as in passives)
c. Feature decomposition of grammatical functions
d. Principles for mapping a-structure roles to (partially specified) GFs in f-structures
e. Principles for mapping a-structure roles and their (partially specified) grammatical functions to skeletal f-structures
f. Well-formedness conditions

Thematic hierarchy and a-structures

(8) a. The thematic hierarchy in (8b) determines the ordering, in the a-structure, of the core participants in the event designated by the predicator.

b. *agent* > *beneficiary* > *experiencer/goal* > *instrument* > *patient/theme* > *locative*

c. Logical subject $\hat{\theta}$: $\hat{\theta}$ designates the most prominent semantic role of a predicator.

Decomposing Grammatical Functions—toward partial specification of f-structures from a-structures

(9) a. Feature Decomposition of GFs: [±r] : thematically (un)restricted / [±o]: (non)objective

	−restricted	***+restricted***
−objective	SUBJ	OBL_θ
+objective	OBJ	OBJ_θ

b. The a-structure features [±*o*] and [±*r*] impose (*partial*) restrictions on the mapping between from a-structure role to f-structure:

$$\begin{array}{lc} \text{a-structure} & \theta \\ & [-r] \\ & | \\ \text{f-structure} & \text{S/O} \end{array} \qquad * \qquad \begin{array}{lc} \text{a-structure} & \theta \\ & [-o] \\ & | \\ \text{f-structure} & \text{O} \end{array}$$

c. $[-r] = \text{SUBJ, OBJ}; \qquad [-o] = \text{SUBJ, OBL}_\theta$

$[+r] = \text{OBJ}_\theta, \text{OBL}_\theta \qquad [+o] = \text{OBJ, OBJ}_\theta$

d. "Note that OBL_θ abbreviates multiple oblique functions, one for each instance of thematic role θ: OBL_{goal}, $\text{OBL}_{\text{instr}}$, and so on. In just the same way, OBJ_θ abbreviates secondary objects that are individuated thematically. [$\text{OBJ}_{\text{theme}}$, OBJ_{ben}, etc.]" (Bresnan & Kanerva 1989:25).

e. GF markedness hierarchy ($-\alpha$ is unmarked)

$\text{SUBJ} > \text{OBJ}/\text{OBL}_\theta > \text{OBJ}_\theta$

Lexical mapping from θ roles to underspecified GFs

(10) a. Partial GF-specification of a-structure roles via ±r/±o (partial specification is required by Monotonicity; see (4a)):

patientlike roles: θ | $[-r]$

secondary patientlike roles: θ | $[+o]$

other thematic roles (e.g., agent, locative): θ | $[-o]$

b. A-structures may also have empty argument roles with no semantic content: these

can only be $[-r]$.

(11) "The intrinsic classifications [in (10)] are a distillation of pervasive cross-linguistic generalizations about the unmarked grammatical encoding of semantic roles. Thus, crosslinguistically, the agent is canonically *not* encoded as a object ... Cross-linguistically, the theme or patient is canonically encoded as an unrestricted function, either subject or object ... Finally, there is cross-linguistic evidence that locative arguments alternate between oblique and subject; particularly in existential sentences, locatives often appear with the basic word-order and other properties of subjects ..." (Bresnan & Kanerva 1989:26).

Conditions on a-structures

(12) **Asymmetrical Object Parameter**—English (*) vs. Mahati ($\surd$)

$$* \quad \begin{matrix} \theta & \theta \\ | & | \\ [-r] & [-r] \end{matrix}$$

(13) a. *put* $<$ $\hat{x}$ (agent) $[-o]$ y (theme) $[-r]$ z (locative) $[-o]$ $>$

b. *pound* $<$ $\hat{x}$ (agent) $[-o]$ y (patient) $[-r]$ $>$

c. *freeze* $<$ $\hat{x}$ (theme) $[-r]$ $>$

Extending the a-structure set of the lexicon via morpholexical rules such as "suppression"

(14) **Passive:** $\hat{\theta}$ / $\emptyset$

(15) **Unspecified object deletion:** θ (θ a patient or a theme) / $\emptyset$

(16) **Recoverability of Suppression:** Only unmarked arguments can be suppressed.

Principles for mapping a-structure to (skeletal) f-structures:

(17) a. Subject roles:

1. $\underset{[-o]}{\hat{\theta}}$ is mapped onto SUBJ when initial in the a-structure; otherwise

2. $\underset{[-r]}{\theta}$ is mapped onto SUBJ.

b. Other roles are mapped onto the lowest compatible function in the partial ordering in (9e)

(18) a. **Function-Argument Bi-Uniqueness:** Each a-structure role must be associated with a unique function, and conversely.

b. **The Subject Condition:** Every predicator must have a subject.

Some 'derivations':

(19) a. **Active agentive verb:**

pound	<	$\hat{x}$ (agent)	y (patient)	>
a-structure		$[-o]$	$[-r]$	
		|	|	
f-structure		S	O	

b. **Passive agentive verb:**

pound	<	$\hat{x}$ (agent)	y (patient)	>
a-structure		$[-o]$	$[-r]$	
		|	|	
lexically 'derived' a-structure		$\emptyset$	$[-r]$	
			|	
f-structure			S	

(20) **Unaccusatives:**

freeze	<	$\hat{x}$ (theme)	>
a-structure		$[-r]$	
		|	
f-structure		S	

(21) a. *We pounded the metal flat*

b. *The metal was pounded flat*

c. **I pounded on the metal flat*

(22) a. *The river froze solid*

b. **The dog barked hoarse*

(23) a. *The dog barked us awake*

b. **The dog fell us awake*

(24) a. Subjects of unaccusatives and passives show object-like properties. For example, they can be predicated over by resultatives as in *The river froze solid*, *The metal was pounded flat*).

Such object-like properties are due to the $[-r]$ feature that they have in common

with the subjects of active transitive verbs: it is stipulated that resultatives apply only to $[-r]$ arguments (no movement is posited).

b. Subject-like properties (e.g., agreement with the verb) are due to the mapping of this argument to SUBJ in f-structure.
Cf. $\quad S \mapsto \quad NP \quad VP$
$\qquad\qquad\quad (\uparrow SUBJ) = \downarrow \quad \uparrow = \downarrow$

LFG Exercise I:

Explain the contrast in (25)

(25) a. *We cooked (for Mary)*

b. **We cooked Mary* (with the reading: *We cooked for Mary*)

Show the 'derivation' for the passive verb in (26)

(26) *Mary was cooked dinner*

Explain the contrast in (27)

(27) a. *Mary was cooked dinner*

b. **Dinner was cooked Mary.*

Explain the contrast in (28)

(28) a. **Dinner was cooked Mary*

b. *Dinner was cooked for Mary.*

Finally consider (29) with the reading *Mary was happy as a result of their cooking dinner for her*:

(29) a. **They cooked Mary dinner happy*

b. **They cooked Mary happy dinner*

Can the ungrammaticality of (29) accounted for, without extra stipulation, by LFG as described in readings and in class? Explain. (in no more than one page)

Throughout, be as explicit as you can in your use of the LFG principles discussed in class and in the readings. In particular, show all the relevant a-structures/f-structure mappings that are relevant to understanding the facts above. (Once these mappings are made explicit, your answers can be made quit concise.)

LFG Exercise II:

Consider the following Japanese data, some of which was briefly discussed in class a few lectures ago.

Japanese is SOV:

(30) *Taro-ga hon-o katta*
Taro-NOM book-ACC bought
"Taro bought a book"

Numeral quantifiers:

(31) a. *Gakusei-ga 2-nin hon-o 3-satu katta*
students-NOM 2-CL_h book-ACC 3-CL_b bought
"2 students bought 3 books"

Some observations on the distribution of NumQs:

(32) * *Gakusei-ga hon-o 2-nin katta*
students-NOM book-ACC 2-CL_h bought
"2 students bought books"

(33) a. *Gakusei-ga 2-nin* [***kono kagi de***] *doa-o aketa*
students-NOM 2-CL_h this key by door opened
"2 students opened the door with this key"

b. * *Gakusei-ga* [***kono kagi de***] *2-nin doa-o aketa*

(34) * [*Tomodati no car*] -ga *3-nin kasyoosita*
friends GEN car NOM 3-CL_h broke-down
"Three friends' cars broke down"

(35) a. *Kuruma-ga 3-dai* ***doroboo-ni*** *nusum-are-ta*
car-NOM 3-CL_m thief-by steal-PASS-Past
"3 cars were stolen by the thief"

b. *Kuruma-ga* ***doroboo-ni*** *3-dai nusum-are-ta*

(36) a. *Doa-ga 2-tu* [***kono kagi de***] *aita*
door-NOM 2-CL_g this key by opened
"2 doors opened with this key"

b. *Doa-ga* [***kono kagi de***] *2-tu aita*

(37) a. *Gakusei-ga 2-nin* [***ofisu-ni***] *kita*
student-NOM 2-CL_h office-to came
"2 students came to the office"

b. *Gakusei-ga* [***ofisu-ni***] *2-nin kita*

(38) *Generalization?*
What generalization can be drawn from the above regarding the syntactic positions where NumQs can(not) surface? (Answer no longer than half a page)

(39) *Japanese NumQs in LFG*
Try and sketch an LFG account for your generalization in (38). Discuss these implications of the above data vis-à-vis the architecture of LFG. (Answer no longer than one page)