

Hypotheses in Generative Grammar

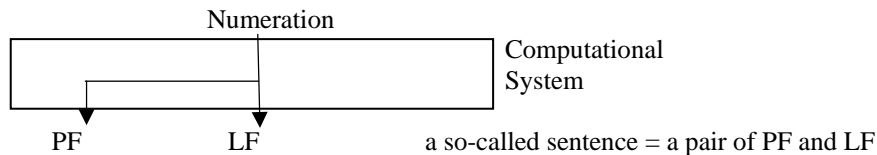
Ayumi Ueyama (Kyushu University, JAPAN)¹

1. Do we need a methodological discussion?

- (1) competence vs. performance

object of investigation

- (2) Computational System = a model for linguistic competence



- (3) grammatical sentences ... sentences which can be derived by the Computational System
ungrammatical sentences ... sentences which cannot be derived by the Computational System
- (4) If the distinction between grammatical and ungrammatical sentences *were* directly observable, the investigation of competence *could* ideally be carried out as ... :
1. Identify some grammatical and ungrammatical sentences.
 2. Hypothesize the Computational System so that it can derive the former but not the latter.
 3. Deduce a prediction based on the hypothesized Computational System.
 4. Test the prediction.

Problem: Actually, what is directly observable is acceptability, not grammaticality.

- (5) Making acceptability judgments (under a specified interpretation)
Input: an example sentence
Output: the sense of acceptability
- (6) Grammaticality (= whether the Computational System has an output or not); see (2).
Input: Numeration
Output: LF & PF
- (7) **Claim:** We need a theory of how a hypothesis about the Computational System can be tested, by specifying the relationship between acceptability and grammaticality.
- (8) Chomsky's attitude towards methodology since 1960's²:
There is no need of methodology as such, insofar as each researcher is rational enough.
- (9) Changes in the theory of Grammar:
a. 1960s:
Grammar with Phrase Structure Rules
= a static system that defined the properties of grammatical sentences
The syntactic derivation cannot be embedded in the activity of acceptability judgment.
b. After the Minimalist Program:
Grammar with Numeration and Merge
= a dynamic system which generates a pair of representations
It is now possible to construct a model of the actual linguistic activity with the Computational System embedded at its center.

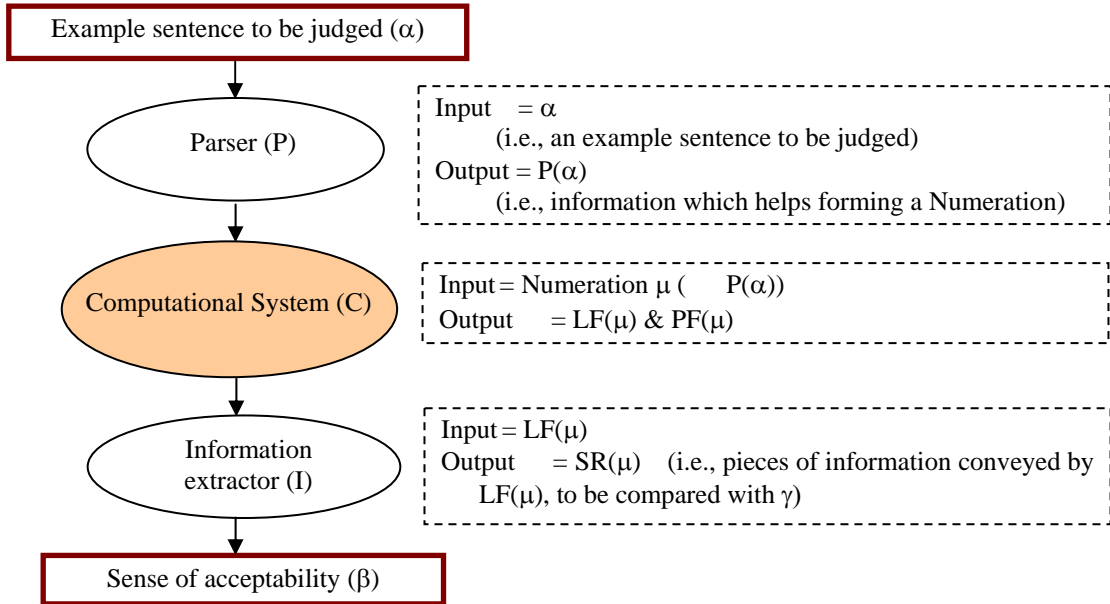
¹ This is basically a joint work with Hajime Hoji, but Ayumi Ueyama is responsible for the particular exposition adopted in this presentation.

² See, for example, Chomsky 1988: 190 (*Language and Problems of Knowledge: The Managua Lectures* (MIT Press, 1988)).

2. Model of acceptability judgments

(10) What is the relation between grammaticality and acceptability?

(11) "Is the sentence α acceptable under the interpretation γ ?"



(12) This activity is considered to be an act of judging α acceptable only if

- a. $PF(\mu)$ is nondistinct from α , and
- b. $SR(\mu)$ satisfies the conditions that must be satisfied in order for γ to be possible.

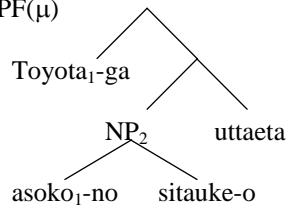
(13) α Toyota-ga asoko-no sitauke-o uttaeta.
 Toyota-NOM that-GEN subsidiary-ACC sued
 'Toyota sued its subsidiary.'

γ *Toyota* and *asoko* refer to the same entity.

(14) $P(\alpha)$ *Toyota-ga* is an argument of *uttaeta* 'sued'
asoko-no modifies *sitauke-o* 'subsidiary'
 The phrase whose head is *sitauke-o* is an argument of *uttaeta*

(15) Numeration μ
 {*Toyota*₁-ga, *asoko*₁-no, *sitauke*₂-o, *uttaeta* }
 (Possibly with some more abstract features or items.)

(16) $LF(\mu)$, $PF(\mu)$



(17) $SR(\mu)$ (which reads as ...)

uttaeta(x_2)(x_1) ... x_1 sued x_2
 x_1 : Toyota ... x_1 is an entity which is called 'Toyota'
 x_1 : asoko ... x_1 is an entity which can be designated by *asoko*
 x_2 : sitauke(x_1) ... x_2 is an entity which is a subsidiary of x_1

(18) Sense of acceptability (which ranges between 0 and 1):

$\beta = [C] [P] [I] + \text{error}$, where
 [C] is 1 if an output obtains and both (12a) and (12b) are confirmed; otherwise, [C] is 0.

[P] is some value (between 0 and 1) which expresses the difficulty in Parsing.
[I] is some value (between 0 and 1) which expresses the unnaturalness of SR.

- (19) In the case of (13);
[C] = 1
[P] should be quite close to zero
[I] may gain some value (i.e., difficulty) because of "x₁ : asoko", but the gained value (i.e., the added difficulty) should not be so great.
- (20) If α is grammatical, its β is some value between 0 and 1.
If α is ungrammatical, its β is always 0.
- (21) What aspects of language (or language-related matters) are expected to be 'systematic'/'analyzable'/'knowable', and to what extent? I.e., what is or can be the object of explanation for a linguistic research?
- (22) Answer to (21):
The knowable aspects of language are concentrated on the three modules in (11).
Among them, the Computational System is fully systematic: its rules and constraints apply whenever it can. The other two modules (Parser and Information Extractor) are more or less systematic but also involve some complications which may not be completely knowable.

3. Observations that deserve special attention: *Licensed observations*

3.1. Licensed observation

- (23) What is the object of explanation for a linguistic research?
(One's answer to (23) crucially depends on his/her opinion regarding (21).)
- (24) Answer to (23):
Any observation is at least considered as an object of explanation if it seems to be related to those three modules in (11). But because of our view on (21), given in (22) above, we would like to select the observations which can be used to identify the contributions of the properties of the Computational System, since (because of its complete systemicity) the prediction deduced from the model of the Computational System is quite rigid and hence valuable for making further predictions.
- (25) What kind of observation is usable for identifying the contributions of the properties concerning the Computational System?
— Licensed observations
- (26) What we can detect:
a. whether the output representation is derived or not
b. whether the output representation satisfies the specified condition γ or not
- (27) An observation has to be accounted for in the terms of :
a. some necessary requirement that a formal feature imposes on a lexical item
b. conditions on the applicability of an operation
c. output conditions on LF or PF
- (20) If a sentence is grammatical, its acceptability value β is some value between 0 and 1.
If it is ungrammatical, its β is always 0.
- (28) Licensed observation
Requirement 1: The observation has to be expressed in the terms of (27).³
Requirement 2: The acceptability judgments of the relevant examples have to pattern with (20).⁴

3.2. Illustration 1: Condition A in English (licensed observation)

- (29) a. John loves himself.
b. *Himself loves John.

³ This requirement 1 roughly corresponds to what Hoji 2003 discussed under the keyword of 'falsifiability'.

⁴ Similarly, this requirement 2 roughly corresponds to what Hoji 2003 discussed under the keyword of 'repeatability'.

- c. *John thinks that Mary loves himself.
d. *John loves herself.
- (30) Hypothesis:
a. An anaphor α is licensed only if there is some other element β which satisfies all the following conditions.
i) β c-commands α .
ii) α and β are co-arguments.
iii) α and β share the ϕ -features (such as gender, number, person)
b. A reflexive pronoun in English is an anaphor.
- (31) ^{ok}Condition:
[... β ... α ...], where the following conditions are all satisfied.
i) α is an anaphor.
ii) β c-commands α .
iii) α and β are co-arguments.
iv) α and β share the ϕ -features (such as gender, number, person)
- (32) *Condition₁:
[... β ... α ...], where the following conditions are all met.
i) α is an anaphor.
ii) β does **not** c-commands α .
iii) α and β are co-arguments.
iv) α and β share the ϕ -features (such as gender, number, person)
- (33) *Condition₂:
[... β ... α ...], where the following conditions are all met.
i) α is an anaphor.
ii) β c-commands α .
iii) α and β are **not** co-arguments.
iv) α and β share the ϕ -features (such as gender, number, person)
- (34) *Condition₃:
[... β ... α ...], where the following conditions are all met.
i) α is an anaphor.
ii) β c-commands α .
iii) α and β are co-arguments.
iv) α and β do **not** share the ϕ -features (such as gender, number, person)

(35)

Hypothesis	^{ok} Condition
	*Condition ₁
	*Condition ₂
	*Condition ₃

- (36) ^{ok}Schema₁:
[NP1 V NP2], where NP2 is a reflexive pronoun, and NP1 and NP2 share the ϕ -features.
- (37) *Schema₁₋₁:
[NP2 V NP1], where NP2 is a reflexive pronoun, and NP1 and NP2 share the ϕ -features.
- (38) *Schema₂₋₁:
[NP1 V [that NP V NP2]], where NP2 is a reflexive pronoun, and NP1 and NP2 share the ϕ -features.
- (39) *Schema₃₋₁:
[NP1 V NP2], where NP2 is a reflexive pronoun, and NP1 and NP2 do not share the ϕ -features.

(40)

Hypothesis ₁	^{ok} Condition	^{ok} Schema ₁	^{ok} Schema ₂	^{ok} Schema ₃
	*Condition ₁	*Schema ₁₋₁	*Schema ₁₋₂	*Schema ₁₋₃
	*Condition ₂	*Schema ₂₋₁	*Schema ₂₋₂	*Schema ₂₋₃
	*Condition ₃	*Schema ₃₋₁	*Schema ₃₋₂	*Schema ₃₋₃

- (41) ^{ok}Example₋₁₋₁:
John loves himself.
- (42) *Example₁₋₁₋₁:
Himself loves John.
- (43) *Example₁₋₂₋₁:
John thinks that Mary loves himself.
- (44) *Example₁₋₃₋₁:
John loves herself.
- (45) Licensed observation:

Hypothesis ₁	^{ok} Condition	^{ok} Schema ₁	^{ok} Schema ₂	^{ok} Schema ₃
	*Condition ₁	*Schema ₁₋₁	*Schema ₁₋₂	*Schema ₁₋₃
	*Condition ₂	*Schema ₂₋₁	*Schema ₂₋₂	*Schema ₂₋₃
	*Condition ₃	*Schema ₃₋₁	*Schema ₃₋₂	*Schema ₃₋₃

- (46) The observation in question satisfies Requirement 2 in (28):
The representative value for all the *Schemata is close enough to zero, and the representative value for ^{ok}Schemata is far better than zero.

3.3. Illustration 2: Condition A in Japanese (not a licensed observation)⁵

- (47) (Allegedly)
- John-ga zibunzisin-o semeta.
John-NOM self-ACC criticized
'John criticized himself.'
 - *Zibunzisin-ga John-o semeta.
self-NOM John-ACC criticized
'*Himself criticized John.'
 - *John₁-wa Mary-ga zibunzisin₁-o semeta to omotteiru.
John-TOP Mary-NOM self-ACC criticized COMP think
'*John thinks that Mary criticized himself.'
- (48) *Examples (which are more or less acceptable):
- John-wa [Mary-ga zibunzisin-ni horete iru to] omoikondeita.
John-TOP Mary-NOM self-DAT is:in:love:with COMP believed
'*John believes that Mary is in love with himself.'
 - John-wa [Mary-ga zibunzisin-o uragiru to-wa] omotteinakatta.
John-TOP Mary-NOM self-ACC betray COMP-TOP not:thought
'*John did not think that Mary would betray himself.'
 - John-wa [Mary-ga zibunzisin-o suisensita to-bakari] omotteita.
John-TOP Mary-NOM self-ACC recommended COMP only thought
'*John firmly believed that Mary recommended himself.'

4. Concluding Remarks: Progress in Generative Grammar

- (23) What is the object of explanation for a linguistic research?
(24)' Answer to (23):

Any observation is at least considered if it seems to be related to those three modules. But because of our view on (21), given in (22) above, licensed observations deserve special attention.

⁵ More instances of licensed observations are discussed in Hoji 2003 which appeared in a *Lingua* special issue, and other downloadable papers found at his webpage.

- (49) How does a linguistic research make progress?
- (50) a. The more *licensed observations*, the better.
 b. The fewer theoretical concepts and relations are needed for expressing the *licensed observations*, the better.
- (51) Normative claim:
 Every empirical assumption regarding the Computational System has to be based on a licensed observation.
- (52) If there is an assumption in the model of the Computational System which is considered to be empirically motivated, but if actually the relevant observation does not qualify as a licensed observation, then the assumption in question should not be used to yield further predictions.

