

The Null Subject Parameter in the 21st century¹

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Outline

- Classical principles & parameters
- The Null Subjects Parameter (NSP) as a key example
- Empirical and conceptual problems
- Empirical developments: a new typology
- Understanding the typology
- Embedding the typology in a minimalist approach to parameters

1. *Classical Principles and Parameters (P&P) Theory*

.. What we expect to find, then, is a highly structured theory of UG based on a number of fundamental principles that sharply restrict the class of attainable grammars and narrowly constrain their form, but with parameters that have to be fixed by experience. If these parameters are embedded in a theory of UG that is sufficiently rich in structure, then the languages that are determined by fixing their values one way or another will appear to be quite diverse, since the consequences of one set of choices may be very different from the consequences of another set; yet at the same time, limited evidence, just sufficient to fix the parameters of UG, will determine a grammar that may be very intricate and will in general lack grounding in experience in the sense of an inductive basis.

(Chomsky 1981:3f.)

So the P&P model

- provides a solution to Plato's problem, the logical problem of language acquisition, in that the otherwise formidable task of language acquisition is reduced to a matter of parameter-setting;
- it makes predictions about language typology: parameters make predictions about (possible) language types;
- Greenberg meets Plato.

2. *The Null Subject Parameter*

- | | | | |
|-----|----|------------------|-----------|
| (1) | a. | Parla italiano. | [Italian] |
| | b. | Habla español. | [Spanish] |
| | c. | Mila ellinika. | [Greek] |
| (2) | a. | *Parle français. | [French] |
| | b. | *Speaks English. | |

¹ This work is funded by the European Research Council Advanced Grant No. 269752 "Rethinking Comparative Syntax" (ReCoS). I'd like to thank my collaborators for useful discussions of aspects the ideas presented here, especially Anders Holmberg. Also a big thanks to Jonathan Bobaljik, Susi Wurmbrand and the students attending my Comparative Syntax seminar at the University of Connecticut, autumn 2015.

Null-subject languages (NSLs): most older Indo-European languages, most Modern Romance languages (with the exception of some varieties of French and some varieties of Rhaeto-Romansch), the Celtic languages (but see McCloskey & Hale (1984) on Irish and Tallerman (1987) on Colloquial Welsh), West and South Slavic, but probably not East Slavic.

NSLs are significantly more widespread than non-NSLs: *WALS* (Map 101 “Expression of Pronominal Subjects”, Dryer 2013) gives 437/711 (61.5%) languages allowing omission of subject pronouns; 82 (11.5%) not (the remainder form various kinds of mixed categories involving clitics, displaced pronouns, etc.).

- (3) The famous parametric cluster (Chomsky 1981, Rizzi 1982):
 - a. The possibility of a silent, referential, definite subject of finite clauses.
 - b. “Free subject inversion”
 - c. The apparent absence of complementiser-trace effects.
 - d. Rich agreement inflection on finite verbs.

- (4) “Free” inversion:
 - a. Hanno telefonato molti studenti.
 - b. *Ont téléphoné beaucoup d’étudiants.
Have telephoned many students.
“Many students have telephoned.”

- (5)
 - a. *Who did you say that – wrote this book?
 - b. *Qui as-tu dit qu’ – a écrit ce livre?

- (6)
 - a. Chi hai detto che -- ha scritto questo libro? (Italian)
Who have-2sg said that – has written this book

 - b. Pjos ipes oti – egrapse afto to vivlio? (Greek)
who said-2sg that – wrote this the book
“Who did you say wrote this book?”

- (7)
 - a. *Italian*: bevo, bevi, beve, beviamo, bevete, bevono (“I drink”, etc.)
 - b. *Greek*: pino, pinis, pini, pinume, pinete, pinun
 - c. *Turkish*²: içiyorum, içiyorsun, içiyor, içiyorsunuz, içiyorlar

3. Problems

3.1 Empirical Problems

Gilligan (1987) tested the correlations put forward by Rizzi (1982) against a 100-language sample, which he attempted to correct for areal and genetic bias. He found just four robust cross-linguistic correlations, taking the properties discussed by Rizzi pairwise:

- (8)
 - a. Free Inversion → expletive null subjects

² But see Öztürk (2001, 2008) for the view that Turkish is a “discourse pro-drop” language.

- b. Free Inversion → allow complementiser-trace violations
- c. Referential null subjects → expletive null subjects
- d. Allow complementiser-trace violations → expletive null subjects

Newmeyer (2005:90-1): “[t]hese results are not very heartening, .. In three of the four correlations, null non-thematic subjects are entailed, but that is obviously a simple consequence of the virtual non-existence of languages that manifest *overt* non-thematic subjects.”

But NB the only implication which does not involve null expletive pronouns: (9b).

“[t]his claim has clear explanatory force in relation to the poverty of the stimulus: the acquirer encountering the relatively accessible phenomenon of free inversion in the PLD will thereby ‘acquire’ the possibility of the complementiser-trace violations, an otherwise fairly inaccessible aspect of the PLD” (Roberts & Holmberg 2010:22; see also Holmberg & Roberts 2014:62-65). See also Cachón, Fetters, Kandel, Pelzl & Phillips (to appear).

3.2 Conceptual problems

- i) The “where are they?” problem:
parameters of the NSP type put an extra burden on linguistic theory, in that they have to be stated somewhere in the model. The original conception of parameters as variable properties associated with invariant UG principles dealt elegantly with this question, but the NSP can only be formulated in this way in terms of a *pro*-licensing module (Rizzi 1986), not straightforward in a minimalist architecture with few or no UG principles and no theory of empty categories;
 - ii) The “what are they?” problem:
it is not clear why just this and other parameters are what they are; there is, in other words, a certain arbitrariness in where variation may or may not occur which is not explained by any aspect of the theory. There is no natural intensional characterization of the notion of what a possible parameter can be.
- (9) Microparameters and the “Borer-Chomsky conjecture,” or BCC (Baker 2008:155f.):
All parameters of variation are attributable to differences in the features of particular items (e.g. the functional heads) in the Lexicon.

More precisely: formal features (in the sense of Chomsky 1995), i.e. Case, ϕ and categorial features, and attraction/repulsion features (EPP features, Edge Features, etc.).

Advantages of this view:

- it seems to be a highly restrictive theory: reducing all parametric variation to features of (functional) lexical items means that many possible parameters simply cannot be stated (Jonathan Bobaljik, p.c.: this probably isn’t true in the absence of a real theory of formal features);
 - ‘associating parameter values with lexical entries reduces them to the one part of a language which clearly must be learned anyway: the lexicon’ (Borer 1984:29);
 - the microparametric approach implies a restriction on the form of parameters, along roughly the lines of (10):
- (10) For some formal feature F, $P = \pm F$. So we could perhaps formulate the NSP in terms of a formal feature of T.

- Fourth, the microparametric view allows us to put an upper bound on the set of grammars. Suppose we have two potential parameter values per formal feature (i.e. each feature offers a binary parametric choice as stated in (14)), then we can define the quantity n as follows:

- (11) $n = |F|$, the cardinality of the set of formal features.
- (12) a. The cardinality of the set of parameter values $|P|$ is $2n$
b. The cardinality of the set of grammatical systems $|G|$ is 2^n .
- (13) For $|F| = 30$, then $|P| = 60$ and $|G| = 2^{30}$, or 1,073,741,824.
- (14) For $|F| = 100$, then $|G| = 1,267,650,600,228,229,401,496,703,205,376$ (Kayne (2005:14)).

This very large space may pose a learning problem (Clark 1992): at the very minimum acquirers must be able to search the space extremely efficiently so as to rule out billions of possible grammars on the basis of impoverished PLD.

The BCC/microparametric approach may be a good descriptive approach but falls short of the original promise of explanation.

So it seems that GB-style macro-parameters have consistently run into empirical and (in the minimalist context) conceptual problems, while microparameters may have problems with explanation.

4. *Three types of null-argument system (Roberts & Holmberg 2010)*

- (15) a. Consistent (Italian, etc.)
b. Radical (Japanese, etc.)
c. Partial (Finnish, etc.)

4.1 *Consistent NSLs*

Five central properties:

- (16) (i) the possibility of leaving the definite subject pronoun unexpressed in any person-number combination in any tense;
(ii) rich agreement inflection on the verb;
(iii) 3sg null subjects restricted to a definite interpretation; an arbitrary null subject (in a finite clause) needs a special marker in the 3sg;
(iv) conform to the Rizzi-Chomsky cluster;
(v) allow overt subject pronouns, but with a different interpretation.
- (17) a. Qui non si può fumare. [Italian]
Here not SI can smoke
- b. Apoghorevete to kapnisma. [Greek]
prohibit-3sg-.mediopass the smoking
“One can’t smoke here”

- (18) a. Lui parla italiano. (Italian)
 HE speaks Italian.
 b. Él habla español. (Spanish)
 HE speaks Spanish.
 c. Aftos mila ellinika. (Greek)
 HE speaks Greek.
- (19) a. Il professore ha parlato dopo che (lui) è arrivato. (Italian)
 The professor has spoken after that (he) is arrived
 “The professor spoke after he arrived.”
 b. I Maria jelase afou (afti) idhe ton Yianni. (Greek)
 The Mary laughed after (she) saw the Yiannis.
 “Mary laughed after she saw Yiannis.”
- (20) a. The professor spoke after he arrived.
 b. Le professeur a parlé après qu’il est arrivé.
- the overt pronoun of the adjunct in (19) does not show the same ambiguity as its English and French counterparts. Instead, it strongly prefers the interpretation which is disjoint from “the professor”, while the English pronouns are, out of context, ambiguous between this interpretation and the one where they correspond to “the professor”.

- (21) The “Montalbetti effect”: overt subject pronouns resist a bound-variable interpretation:
 Todos los estudiantes piensan que (ellos) son inteligentes.
 All the students think that (they) are intelligent
 -- inclusion of *ellos* blocks the bound-variable interpretation (iffy judgement and several potential confounds here).

4.2 Partial NSLs (Holmberg 2010)

- (22) Properties (compare (16)):
- person restrictions on omission of a definite subject pronoun, especially 3rd-person in root contexts;
 - not necessarily very rich agreement inflection on the verb;
 - 3sg null subjects can have an indefinite interpretation without the need for a special marker;
 - subjects frequently raise to SpecTP (or higher) → no general “free-inversion” option → don’t generally conform to the Rizzi-Chomsky cluster;
 [Gilligan was unable to control for this kind of system; how might his results look if we do this?]
 - allow overt subject pronouns with no interpretative difference.
- (23) Holmberg (2005) on Finnish:
- (Minä) puhun englantia “I speak English, etc.”
 I speak-1sg English
 (Sinä) puhut englantia
 You speak-2sg English

*(Hän) puhuu englantia
He/she speak-3sg English
(Me) puhumme englantia
We speak-1pl English
(Te) puhutte englantia
You speak-2pl English
*(He) puhuvat englantia
They speak-3pl English

Holmberg (2005: 539): “A 3rd person definite subject pronoun can be null when it is bound by a higher argument, under conditions that are rather poorly understood”:

- (24) Pekka_i väittää [että hän_{i/j}/Ø_{i/*j} puhuu englantia hyvin].
Pekka claims that he speaks English well
- (25) Täällä ei saa polttaa.
Here not may smoke
“One can’t smoke here”
- (26) a. É assim que faz o doce. [Brazilian Portuguese]
is thus that makes the sweet
‘This is how one makes the dessert.’
- b. É assim que se faz o doce. [European Portuguese]
is thus that SE makes the sweet
‘This is how one makes the dessert.’
(Holmberg 2010:92)

Interaction with EPP effects:

- (27) a. João me contou que na praia vende cachorro quente. [BP]
João me told that at.the beach sell-3sg dog hot
“João told me that **hot dogs are sold/one sells hot dogs** at the beach.”
- b. João me contou que ele/Ø vende cachorro quente na praia. [BP]
João me told that he sell-3sg dog hot at.the beach
“João told me that **he/*one sells hot dogs** at the beach.”
- (28) a. Jari sanoo että tässä istuu mukavasti. [Finnish]
Jari says that here sits comfortably
“Jari says that **one/*he** sits comfortably here.”
- b. Jari sanoo että Ø istuu mukavasti tässä. [Finnish]
Jari says that here sits comfortably
“Jari says that ***one/he** sits comfortably here.”
- If “*pro*” must raise in (27b, 28b) then we don’t expect free inversion/C-t violations.
 - NB *ele* in (27b) can be coreferent with *João*.

- (29) a. Holmberg's Other Generalization (HOG):
In partial NSLs, a 3rd-person generic null subject doesn't need a special marker.
- b. definite NSLs occupy a higher position in partial NSLs than generic ones (interaction with "EPP", as in (27, 28)).
- (30) "Control" of 3rd-person null subject must be local:
- a. Juha₁ ei ole sanonut mitään, mutta Pauli₂ sanoo että *Ø₁ haluaa ostaa uuden auton. [Finnish]
'Juha₁ hasn't said anything, but Pauli₂ says that he₁ wants to buy a new house.'
- b. Gianni₁ non ha detto niente, ma Paolo₂ ha detto che Ø₁ vuole comprare una macchina nuova. [Italian]
'Gianni₁ hasn't said anything, but Paolo₂ says that he_{1/2} wants to buy a new house.'

Other partial NSLs: Marathi (Holmberg, Nayudu & Sheehan 2009), Russian, Hebrew ...

4.3 Radical/discourse pro-drop languages

Properties (Huang 1984, Tomioka 2003, Saito 2007, etc.):

- (31) (i) no person restrictions on omission of subject or object pronouns of any kind (but some restrictions, at least in Mandarin, on 3rd-person null arguments in embedded contexts, see in particular Li 2014);
- (ii) no agreement inflection on the verb (or anywhere else, seemingly);
- (iii) 3sg null subjects can have an indefinite interpretation without the need for a special marker;
- (iv) very unclear what the nature of the subject position(s) is/are, but nothing really comparable to "free-inversion" → don't generally conform to the Rizzi-Chomsky cluster, but many of these languages lack overt wh-movement and many may lack complementizers;
[again there may be implications for Gilligan's results here]
- (v) allow overt subject pronouns with no interpretative difference (again some possible complications in Mandarin).
■ NB (iii) and (v) resemble partial NSLs, a point we'll come back to.
- (vi) sloppy readings possible, suggesting bare-NP ellipsis.

(32) Mandarin (Huang 1984):

- a. -- kanjian ta le
(he) see he Asp
- b. Ta kanjian – le.
He see (him) Asp
"he saw him."

(33) Discourse Pro-Drop Generalization:

"All languages which allow discourse pro-drop allow (robust) bare NP arguments ... Null pronouns in Discourse Pro-Drop languages are simply the result of N'-Deletion/NP-Ellipsis without determiner stranding" (Tomioka 2003:336).

- (34) Null arguments as ellipsis (Oku 1998, S.W. Kim 1999, Tomioka 2003, Duguine 2013):
- a. Hanako-wa [zibun-no teian-ga saiyoosareru to] omotteiru.
H-TOP self-GEN proposal-NOM accepted-be that think
“Hanako thinks that her proposal will be accepted.”
 - b. Taroo-mo [– saiyoosareru to] omotteiru.
T-also accepted-be that think
“Taroo also thinks that his/her proposal will be accepted.”

(34b) allows a sloppy reading → gap not *pro* (“her proposal” not “it”).

5. Understanding the Typology

5.1 Basic analysis

- (35)
- a. **Radical NSLs:** T .. *pro*_[-φ]
NB here T can't have [uφ] as it would never be valued (Saito 2007).
 - b. **Partial NSLs:** T_[φ] .. *pro*_[φ]
-- *pro* is indefinite and incorporates → arbitrary interpretation. Definite 3rd-person interpretation from a local antecedent; 1st/2nd-person interpretation from “speech-act” operators in the left periphery (Holmberg 2010).
 - c. **Consistent NSLs:** T_[φ,D] ... *pro*_[φ, D]
-- D-to-T incorporation
 - d. **Non NSLs:** T_[φ] ... *pro*_[φ, D]
-- D-to-T incorporation blocked *pro* has more features than T (Roberts 2010); D spelt out as a pronoun

(36) Questions

What is *pro*?

Why does it need to be licensed in exactly these ways?

How is *pro* similar to/different from overt pronouns? From PRO?

Why do we have this menagerie of types of NSL (fascinating though they are)?

5.2 Similarities between partial and radical NSLs

Barbosa (2014): “the pattern of pro-drop found in partial NSLs has more features in common with discourse pro-drop than with rich agreement pro-drop.”

- (37) Generic inclusive arbitrary *pro* in radical NSLs:
- a. Ah John waa hai Jinggwok jiu gong Jingman. [Cantonese]
Prt John say in England need speak English
“John says that one/he needs to speak English in England.”
 - b. Haru-ga kure-ba, tabi-ni de-taku-naru. [Japanese]
spring-NOM come-when trip-TO leave-want-become
"When spring comes, one wants to go on a trip."

- (38) Structure of null arguments:
 [DP \emptyset [NP *pro*]]
 Here *pro* is a radically empty NP, so we could equally write [NP *e*] .
- (39) Partial NSLs allow bare NPs:
- a. Kirja on pöydällä. [Finnish]
 book is table-on
 “The book is on the table.”
- b. polis-An-nI cor pakaD-I-A [Marathi (Holmberg et al 2009)]
 police-pl-ERG thief.M catch-PERF-M
 “The police caught the thief.”
- c. Cachorro(s) gosta(m) da gente. [BP]
 Dog(s) like(s) of people
 “Dogs like people.”
- (40) Partial NSLs allow object drop:
- a. Kalle väittää että Pekka uhkaili ---. [Finnish]
 Kalle claim-3sg that Pekka threaten-Pst
 “Kalle claims that Pekka threatened him.”
- b. O estudante levou o livro para a biblioteca depois que leu ---.
 The student took the book to the library after that read
 [BP, where there is an animacy restriction; Cyrino 2016].

Partial/radical NSLs vs. consistent NSLs (on the latter see below).

Barbosa:

Differences between radical and partial NSLs derive from the nature of the “article system”, i.e. the realisation/presence of functional heads in the extended projection of N.

[NP *e*] “may be further embedded under a null Number or Classifier head, or even under a null D, depending on the language and the context” (Barbosa 2014).

5.4 Extension to consistent NSLs (see also Barbosa 2014:49)

- (41) $T_{[\phi,D]} \dots [DP D_{[\phi]} \dots [NP pro]]$ -- D-to-T incorporation as before

Here [NP *pro*] is prevented from having other properties of radical/partial NSLs as it’s **locally licensed by D’s phi-features** (and hence definite).

- (42) Null-argument typology revisited in the light of the above:

Radical: $T \dots [DP \emptyset_{[-\phi]} \dots [NP pro]]$
 NB here T can’t have [u ϕ] as they’ll never be valued.

Partial: $T_{[\phi]} \dots [DP (D)_{[\pm\phi]} \dots [NP pro]]$
 variation in nature of D’s phi-features here

Consistent: $T_{[\phi,D]} \dots [DP D_{[\phi]} \dots [NP pro]]$
 -- D-to-T incorporation as before

Non: $T_{[\varphi]} \dots [DP D_{[\varphi]} \dots [NP pro]]$
 -- D-to-T incorporation blocked as before; D spelt out as an overt pronoun

(43) *Pro* is now reduced to:

$[DP D_{[\pm F, \pm G]} \dots [NP e]]$

And $[\pm F, \pm G]$ give us the NSP(s).

We eliminate an empty category (leaving just PRO) and our account of parametric variation is BCC-compliant (formal features of D vary).

5.5 *A bit of semantics*

(44) The semantics of *e*: $e = ONE$ (Elbourne 2005).

(45) $[[ONE]] = \lambda x: x \in De. x \in De$

- ONE is of type $\langle e, t \rangle$ (a property trivially true of any individual in domain D)
- Barbosa: ONE undergoes semantic incorporation into the predicate, functioning as a predicate modifier (Dayal 2003)
- Therefore the argument place isn't saturated; this can be done in one of two ways:
 - (i) existential closure: for any $P \in D_{\langle e, t \rangle}$, \exists -closure(P) = $\exists x. [P(x)]$
 - (ii) type-shifting: for any $x \in D$, $P \in D_{\langle e, t \rangle}$, *Iota* (P) = $\iota x. [P(x)]$

BUT the evidence for a property-interpretation of $[NP e]$ is slight, and the semantic aspects of the analysis rely on these rather powerful devices (which Barbosa also uses to account for quite a bit of cross-linguistic variation).

An alternative:

(46) SpecnP is the external-argument position of NP, to which the noun assigns its R(eference) role (Williams 1981, 1994):

“*Pro*”: $[DP D \dots [nP x [n [NP ONE]]]]$

- now we can treat *pro* as an individual variable (type $\langle e \rangle$), the R-argument of ONE;
- no need for type-shifting.

(47) “*pro*-licensing” now follows from a natural LF-interface condition, the Bijection Principle (Koopman & Sportiche 1982):

There is a bijective relationship between quantifiers and variables.

- no vacuous quantification (**Who did John see Bill?*)
- no free variables

$[nP x]$ has to survive somehow, and there are various ways to do it, depending on context and on the feature make-up of D and T.

NB if we want the Bijection Principle to have teeth we shouldn't countenance a general possibility of existential closure.

- (48) Linking the semantics to the syntax:
- a. where the null argument represents an ellipsis site, LF-copying substitutes the variable;
 - b. “Discourse-binding” (from a higher clause or by “speech-act” features in C); but NB Barbosa’s (2014:38f.) suggestion that the 3rd-person embedded anaphoric NS in partial NSLs is a null long-distance reflexive.
-- this goes for both partial and radical NSLs (with LF-copying more pervasive in the latter).

- (49) A final, crucial option for definite NS in consistent NSLs:

PERS_x [ONE(*x*)] (where PERS is a cover term for 1,2,3 etc)

→ This is where D_[φ] binds [_{NP} *x*] in consistent NSLs (and in non-NSLs, where D doesn’t also incorporate into T and hence is realised as an overt pronoun).

(NB PERS itself may require licensing by “speech-act” features; Frascarelli 2007)

5.6 Back to the typology

The parametric variation lies in the features of these (and other) functional heads:

- (50) Null-argument typology, third – and final -- pass:

Radical: T .. [_{DP} Ø_[φ] ... [_{NP} *x* [_{NP} ONE]]]

x replaced by LF-copying or bound from outside DP (binding by a generic Op or unselective binding by T/Asp for indefinite/arbitrary pronouns)

Partial: T_[φ] .. [_{DP} (D)_[±φ] ... [_{NP} *x* [_{NP} ONE]]]

x bound by D, T or C (considerable cross-linguistic variation on this)

Consistent: T_[φ,D] ... [_{DP} D_[φ] ... [_{NP} *x* [_{NP} ONE]]]

-- D-to-T incorporation as before, *x* bound by D

Non: T_[φ] ... [_{DP} D_[φ] ... [_{NP} *x* [_{NP} ONE]]]

-- D-to-T incorporation blocked as before; D spelt out as an overt pronoun, and bound by D

(Arbitrary pronouns in the last three must all have some defectivity in the φ-features of D, allowing binding by a generic or other operator from outside DP; in consistent NSLs this is always marked by a special clitic or suffix: HOG)

- (51) Why these four types?

If we identify D’s φ-features with definiteness/indefiniteness marking (Longobardi 2008, Richards 2014), and call languages which mark definiteness/indefiniteness in DP “rich D” languages, then we have:

Rich D?	Rich agreement?	
+	+	Italian, etc., i.e. consistent NSLs
+	-	English, etc., i.e. non-NSLs
-	+	partial NSLs
-	-	radical NSLs

-- consistent and non-NSLs (Romance, Germanic, etc.) have definite and indefinite articles OR rich clitic systems (non-Bulgarian/Macedonian South Slavic; probably also Polish and Czech), Arabic may be a problem as it’s a consistent NSL but lacks an indefinite article;

- partial NSLs have “more” verbal agreement inflection than English, but either no articles (Russian), only definite articles (Hebrew, Icelandic) or the possibility of bare singular count nouns in argument position (BP; Schmitt & Munn 1999);
- radical NSLs lack articles and clitics altogether.

- So we now have a satisfactory account of null arguments and a new typology but the where and what questions about parameters in general still remain.

6. *A minimalist approach to parameters*

- (52) The Big Idea: parameters, and parameter hierarchies, are emergent properties, arising from the interaction of Chomsky’s three factors in language design:
- a. F1: radically underspecified UG (no specification of formal features)
 - b. F2: Primary Linguistic Data (and the way the learner interacts with it)
 - c. F3: conservative learning strategies.
- this solves the “where are they?” problem (see §3.2)
- (53) The third-factor learning strategies:
- (i) Feature Economy (FE) (see Roberts & Roussou (2003:201)): Postulate as few formal features as possible.
 - (ii) Input Generalisation (IG) (see Roberts (2007:275)): Maximise available features.
- (54) On the “what are they?” problem:
- a. Microparameters (encoded as formal features of functional heads) are hierarchically organized.
 - b. Macroparameters are simply aggregates of microparameters acting in concert on the basis of a conservative learning strategy.
- (55) A hierarchy for null arguments:
- a. Are ϕ -features present in the system?(Y/N)
N: radical pro-drop/LF-copying (Japanese, etc.)
 - b. Y: are fully specified ϕ -features generalised to all probes?
Y: “pronominal-argument” language (consistent nullness of all arguments (Basque, etc.)
 - c. N: If not, are fully specified ϕ -features found on T and D [implying a D-feature on T]?
Y: consistent NSL (Italian, etc.)
 - d. N: are ϕ -features found on T [and so not D, given (c)]?
Y: partial NSL (Finnish, etc.)
 - e. N: are ϕ -features found on D [and so not T, given (c, d)]?³

³ Perhaps a better alternative to (55e) would be:

(i) N: are ϕ -features found on n?
Y: “non”-NSL/weak person (English, etc.).

Here “weak person” is intended in the sense of Longobardi (2008), implying lack of N-to-D movement, etc.

Y: “non”-NSL (English, etc.)

...

NB the NO > ALL > SOME pattern here, created by the interaction of FE and IG.
Reduction of the variation space by hierarchical organisation.

Number of parameters	Independent	Dependent
2	4	3
10	1024	11
20	1048576	21
30	1073741824	31

The hierarchies are supposed to simultaneously give:

- Typological information: higher options less marked and therefore more frequent (this is hard to verify in the case of null arguments as the partial vs consistent distinction isn't widely documented)
- Indicate a learning path (cf. Early Null Subjects)

Why are ϕ -features so important? This could really be about Person. Cf. Longobardi's (2008) Denotation Hypothesis:

(56) **Denotation hypothesis:**

Individuals are denoted through the Person feature.

(57) DP-internal binding of the variable in Spec,nP

[_{DP} D_i ... [_{nP} x_i [n [_{NP} N_{<e,t>}]]]]

Implies all non-expletive DPs contain a variable, not just pronouns.

7. *Conclusion*

NSL phenomenology and typology stem from:

- The nature of [_{nP} x] (UG)
- Ban on free variables (Bijection Principle; UG?)
- ϕ -features of T (underspecified in UG)
- ϕ -features of D (underspecified in UG)
- The ϕ -features form a hierarchy (UG + F3)
- Ways of licensing [_{nP} x] independent of NS (broader aspects of DP syntax, only touched on here).

We have a richer notion of null subjects empirically and a deeper understanding of what they are, as well as a fairly simple characterisation of the variation.

Investigating UG by looking at the NSP(s) is still worth doing in the 21st century!

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