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Functional structure and parametric variation: consequences of conflicting interface conditions

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1. Introduction: the Strongest Minimalist Thesis

(1) The Strongest Minimalist Thesis (SMT): Language is an optimal solution to interface conditions that the Faculty of Language (FL) must satisfy (cf. Chomsky 2004b).

(2)

Sensory-Motor System (SM)	Faculty of Language (FL)	Conceptual-Intentional System (C-I)

(3) Different interface conditions, SM interface conditions and C-I interface conditions, may be conflicting.

(4) This leads to a new perspective on satisfying interface conditions in an optimal way: suppose that a particular C-I and SM interface condition are to some extent conflicting; if a grammar G solves the particular C-I condition in an optimal way, for that reason it does not solve the particular SM interface condition optimally and vice versa.

(5) Given the fact that conflicting interface conditions lead to the solution of interface conditions in a suboptimal way, individual languages can maximally optimally solve interface conditions in different ways.

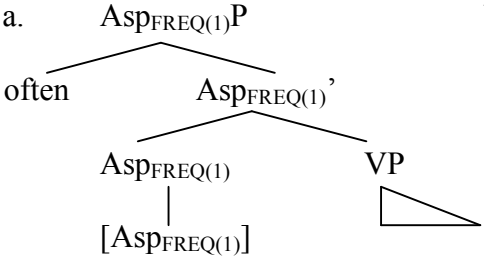
(6) Every grammar G forms a maximally optimal solution to legibility conditions at the (different) interfaces.

(7) Goal of this talk: to see how much of grammatical variation can be explained as a result of (6). First I discuss the existence of functional structure; second I discuss the notion of parameters and parametric variation; third I focus on a number of empirical facts that support the conclusions put forward in this paper: negative concord, the semantics of modal auxiliaries and focus-sensitive particles.

2. Functional structure: adjunction vs. multiple projections

(8) What is the syntactic status of adverbials? Do they occupy (spec) positions of designated functional projections (as argued for by (Cinque 1999)), or do they adjoin to existing projection such as VP or IP?

(9) a.



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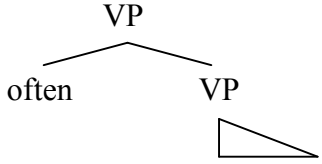
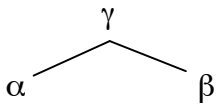


(10) What interface conditions would favour which structure? Note that the adoption of a particular functional projection, including empty positions, and a (formal) feature responsible for the projection in the first place is not necessary for the C-I system and thus cannot be motivated on this ground.

(11) The C-I interface condition requires (at least) that the interpretation of higher nodes in the structure follow compositionally through Function Application (FA) (Heim and Kratzer 1998).

(12)



(13) FA: $||\gamma|| = ||\alpha(\beta)|| = ||\alpha||(||\beta||)$

(14) Given the (standard) assumptions on the C-I interface, the latter structure in (9) is favoured and the first one can thus not be derived from C-I interface conditions. However, this is not the case for the SM interface.

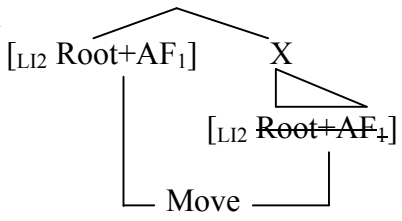
(15) Note that (12) requires the existence of two lexical items that are lexical words (16). α in this case cannot be an affix. From the SM perspective a structure like (17) would be preferred.

(16) $[LI_1 + LI_2]$

(17) $[_{LI2}$ Root-$AF_1]$

(18) Semantically, (17) cannot be interpreted at LF, since it contains two interpretable elements that are interpreted and take scope in the same position. In order to keep the structures like (17) interpretable, dislocation must be introduced: either the complex element must be moved to a second position, such that in each position one semantic operation is interpreted, or the element carrying the affix stands in an Agree relation with an abstract operator following (Adger 2003) in adopting Agree between higher interpretable and lower uninterpretable features.

(19) a.



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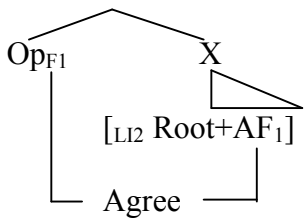


(20) Phonological conditions (i.e. conditions that imposed on the FL by the SM system) require the presence of abstract material, contrary to those conditions that are imposed on the FL by the C-I system. The existence of functional structure can then be seen as resulting from a phonology-semantics mismatch.

(21) The relation between the two elements in (19) is not only configurational, but also lexical. In (19)a the two elements are copies and therefore they are semantically, syntactically and phonologically identical. All phonological and semantic interpretable material will be interpreted only once (after deletion). Uninterpretable material will be deleted throughout the derivation. In any case, all uninterpretable (formal) feaures that the lowest copies has are shared by the highest copy.

(22) Given that Move only takes place if necessary, one of the features of the moved element must have been the perfect candidate to solve a checking requirement of a lexical element in the higher position. Hence the moved element shows that there is a feature checking relation that involves formal features that are carried by the moved element.

(23) The identity requirements do not hold for (19)b. Op_{F1} here is a different lexical item than [Root+Af_1]. However, Op_{F1} is not realised phonologically. Hence it must be licensed (i.e. it must be detectable). The most straightforward way to account for this licensing is to say that without the assumption of this abstract operator the derivation would have been crashed. Hence the licensing is reduced to an instance of phonological economy.

(24) Phonological economy: A phonological empty operator may be assumed iff it prevents a derivation from crashing.

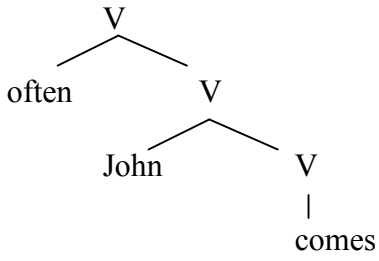
(25) The consequence of (24) is that in cases such as (19)b the operator must be assumed to have an interpretable formal feature [iF] and [Root+Af] should carry its uninterpretable counterpart [uF].

(26) To conclude: extra structure is required to host copies of lexical items or phonologically empty operators. In other words, dislocation licenses functional structure.

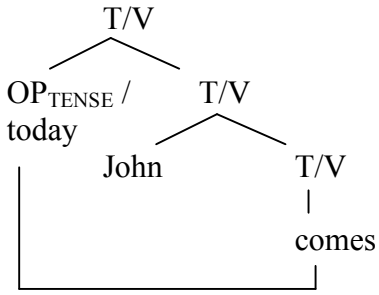
(27) Moreover the elements that yield the dislocation must share some formal features and thus stand in a checking relation: in the case of Move with the position that attracted the movement, in the case of Agree between the operator and the inflected lexical item.

(28) Given that projection always involves projection of (formal) features, it follows why in the case of dislocation (Move/Agree) extra functional projections may be created: there is material that may be projected and there is no principled explanation why these features should not be allowed to project. Cross-linguistic variation is thus expected to be attested.

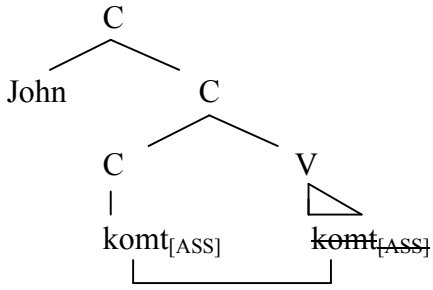
(29) FA



(30) AGREE



(31) MOVE

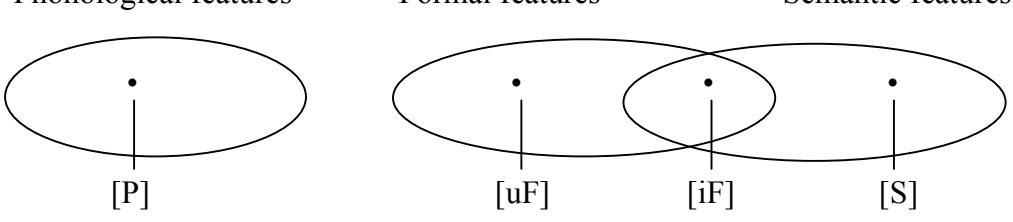


3. Formal features

(32) Given that for any semantic operator OP_F languages may chose which marking strategy they exhibit, and that only some strategies require functional structure a rigid (cartographic) view on clausal structure seems more unlikely than a flexible view. This particularly concerns the set of available functional projections: the set of functional projections that languages have at their disposal does not seem to be uniform across languages and therefore not part of UG.

(33) Given the traditional assumptions that functional projections are projected by a formal feature, the hypothesis will be that the set of formal features is not part of UG.

(34)



(35) If the set of formal features is empty in the initial stage, L1 learners must acquire which features are formal(ised) and which features are not.

(36) Properties of formal and semantic features:
a. $||X_{[F]}|| = ||X_{[iF]}||$
b. [iF] is the counterpart of [uF], and vice versa

(37) Properties of [uF]'s:
a. [uF] is semantically vacuous
b. [uF] triggers syntactic operations Move and Agree (Chomsky 1995; Chomsky 2001)

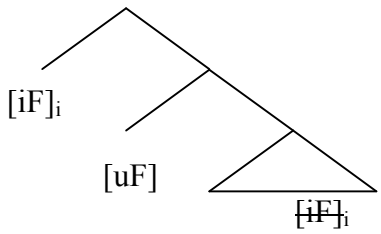
(38) Proposal:
a. Every feature [F] is first analysed as a semantic feature ([F])
b. Only if there is positive evidence in the language input for a [F] having to be analysed as [uF], the semantic feature [F] is reanalysed as [i/uF]

(39) Both properties in (37) reduce to doubling properties.

(40) [uF] is semantically vacuous, but marks the presence of a feature [iF], without which the derivation would crash. Hence the functional category F is manifested twice in the morphosyntax, whereas its semantic force is only contributed once.

(41) Agree: [[uF] [[iF]]]

(42) Move (Agree + Pied-piping + Merge):



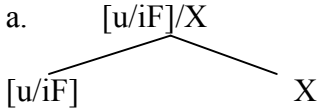
(43) If a feature [F] appears to be subject to doubling properties, this forms a cue that in some cases [F] comes about as [uF], and therefore [F] is reanalysed as [i/uF]

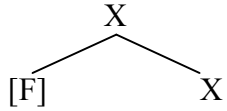
(44) Doubling effects with respect to F
[F] ⟶ [u/iF]

(45) The set of formal features is empty at the initial stage of the language learning process. During L1 acquisition several semantic features may be formalised, i.e. 'syntactisized' (or: grammaticalized), as a result of doubling effects: the ability of a functional category F being manifested in the morpho-syntax more than once. Doubling effects function in the sense of so-called 'informatic principles'.

(46) Flexible Formal Features (FFF) Hypothesis
a. Every feature [F] is first analysed as a semantic feature ([F]).
b. Only if there are doubling effects with respect to F in the language input, [F] has to be reanalysed as a formal feature [i/uF].[1]

(47) Consequence: if doubling is the driving force behind feature formalisation, only in languages that exhibit doubling effects w.r.t. F, [i/uF] may project. Consequently, only among those languages a head F° may be realised.

(48) a. 

b. 

(49) Overt F° → F-Concord/Doubling

(50) Since doubling and phrasal status are detectable, the FFF hypothesis can be tested empirically!

4. Empirical facts

4.1 Negative Concord

(51) Languages differ w.r.t. the interpretation of sentences consisting of multiple negative elements. In Double Negation (DN) languages each morpho-syntactically negative element corresponds to a semantic negation. In Negative Concord (NC) languages multiple negative elements correspond to one semantic negation.

(52) a. Jan ziet *niemand* — Dutch
Jan sees n-body
'Jan doesn't see anybody'
b. *Niemand* zegt *niets*
N-body says n-thing
'Nobody says nothing'

(53) a. Milan *(*ne*)vidi *nikoho* — Czech
Milan NEG.saw n-body
'Milan didn't see anybody'
b. Dnes *(*ne*)volá *nikdo*
Today NEG.calls n-body
'Today nobody calls'

[1] The FFFH is not a hypothesis for an L1 acquisition theory. It is motivated by learnability requirements and should, if correct, count as a prerequisite for L1 acquisition theories.

c. Dnes *nikdo* *(*ne*)volá
Today n-body NEG.calls
'Today nobody calls'

(54) (Zeijlstra 2004; Zeijlstra 2006), following (Ladusaw 1992; Brown 1999), analyses NC as an instance of syntactic agreement. N-words carry an uninterpretable feature [uNEG], which must be checked against a negative operator, that carries [iNEG] and which may be left phonologically abstract.

(55) The syntactic agreement analysis of NC is supported by the fact that NC obeys all conditions that grammatical/syntactic dependencies require (cf. (Koster 1987; Neeleman and Van de Koot 2002)):
a. Each dependent must take an antecedent
b. The antecedent must be in a c-commanding position
c. The antecedent must be sufficiently close to the dependent
d. Each dependent must take a unique antecedent
e. An antecedent may be linked to multiple dependents

(56) Space and time limits prevent me here from doing justice to other accounts of NC. The reader is referred to (Zeijlstra 2004; Zeijlstra 2006) for a critical evaluation of other theories (Haegeman 1995; Haegeman and Zanuttini 1996; de Swart and Sag 2002) who propose an analysis in terms of polyadic quantification, (Ladusaw 1992; Giannakidou 2000) who account for NC in terms of NPI licensing or (Herburger 2001) for an analysis in terms of lexical ambiguity) and a discussion of problems that these theories have been facing.

(57) $||\text{n-Q}|| = \lambda P.[Q(x) \,\&\, P(x)]$, where $Q \in \{$**Person'**, **Thing'**, **Place'**, …$\}$

(58) $||Op_{\neg[iNEG]}|| = \neg(\exists)$

(59) Multiple Agree applies (cf. (Haraiwa 2000; Haraiwa 2001; Ura 1996))

(60) Milan *ne*vidi *nikoho* Czech
Milan NEG.sees n-body
'Milan doesn't see anybody'

(61) $[_{\text{NegP}}\ Op_{\neg[iNEG]}\ [_{\text{Neg}^{\circ}}\ ne\text{vidi}_{[\sout{uNEG}]i}\ [_{v\text{P}}\ \text{Milan}\ nikoho_{[\sout{uNEG}]}\ t_i]]]$

(62) Prediction: if negation is a flexible category, only in NC languages the negative feature may project. Consequently, only in NC languages one may find negative markers that are syntactic heads (Neg°).

(63) Overt Neg° → NC

(64) This prediction is born out. In (Zeijlstra 2004) it is shown on the basis of 25 diachronic and 267 dialectal varieties of Dutch and a sample of 40 other languages that every language/variety that exhibits an overt negative head is also an NC language/variety.

4.2 Modal Concord

(65) Modal verbs in English form a separate class ((Pollock 1989) amongst many others).

(66) a. Modal verbs may not be infinitival:
*To can swim is useful
b. Modal verbs cannot iterate
*He shall must do it
c. Modal verbs do not take DP complements:
*I shall you a penny
d. Modal verbs may precede *not*:
If I {*gave/shall} not …
e. Modal verbs move to C° under inversion:
How many languages {*<speak>/can} you <speak>

(67) A consequence of the FFF Hypothesis would be that multiple modals (may) give rise to concord readings. It has been shown for English that they do indeed (Halliday 1970; Lyons 1977; Geurts and Huitink 2006). Note that it must hold that the modal types (epistemic, deontic, …) and the quantificational force (existential, universal) must be identical.

(68) a. You may possibly have read my little monograph upon the subject[2]
'The speaker things that it is possible that you read his little monograph '
b. Power carts must mandatorily be used on cart paths where provided
'It is obligatory that power cats are used on cart paths where provided'

(69) $[_{IP}$ You $[_{ModP}$ possibly$_{[iMOD\text{-}EPIS\text{-}\exists]}$ $[_{Mod°}$ may$_{[uMOD\text{-}EPIS\text{-}\exists]}]$ $[_{VP}$ …]]]

(70) $[_{IP}$ You $[_{ModP}$ $Op_{MOD\text{-}DEON\text{-}\exists}$ may$_{[uMOD\text{-}DEON\text{-}\exists]}$ $[_{VP}$ read]]]

(71) You cannot read
'It is not possible for you to read'
¬ > CAN

(72) Prediction: if modal auxiliaries constitute e functional projection of their own, then modal concord is expected to be available. So far this prediction is born out. Languages, such as Dutch, German, English and Hungarian exhibit modal Concord; Russian, that does not have any modal auxiliaries that are a designated head, lacks Modal Concord either.

[2] Data taken from Geurts & Huitink (2006)

4.3 Focal Concord

(73) In Hungarian, focussed elements move to a designated position, normally occupied by the verbal modifier (E. Kiss 1998; E. Kiss 2002).

(74) a. Anna felhívta Emilt Hungarian
Anna VM.called Emil
'Anna called Emil'
b. Anna EMILT hívta fel
Anna Emil called VM
'It was Emil who Anna called'

(75) Following standard assumptions focussed elements introduce a set of alternatives on which a focus-sensitive, such as 'only' or 'even' operates on (Jackendoff 1972; Rooth 1985; Krifka 1991; von Stechow 1991; Rooth 1992). In case of absence of an overt focus operator (Jacobs 1984) argues that the operator that encodes the illocutionary force binds the focussed elements. At least in English, German and Dutch the licensing requirements of focussed elements in principle follow straightforwardly from the semantics and do not require additional syntactic constraints.

(76) John called (only) SUE
'John called Sue and nobody else'

(77) Focus operators may bind multiple focussed elements. In that case a pair-reading is required, where the focus operator applies to pairs of alternatives of each focussed element. This mechanism is strictly compositional (Krifka 1991).

(78) John introduced only BILL to SUE
'The only pair of persons such that John introduced the first to the second is the pair Bill-Sue'

(79) If there are two foci and two focus operator (in proper order), the pair reading does not apply, but there are simply two focus operations.

(80) Even_1 JOHN_1 drank only_2 WATER_2

(81) However, in Hungarian such construction may also have a pair-reading (Balogh 2006; Balogh 2006).

(82) Csak ANNA hívta fel csak EMILT Hungarian
Only Anna called VM only Emil
1. 'The only pair of persons such that the first called the second is the pair Anna-Emil'
2. 'Only Anna called only Emil, the others nobody or persons'

(83) Apparently, the focus operator is not induced from the *csak* 'only' but from an abstract operator that is marked by *csak*.

(84) $[_{FocP}\ Op^{EXH}_{[iFOC]}\ Csak_{[uFOC]}\ [_{VP}\ hívta\ fel\ [csak_{[uFOC]}\ EMILT]]]$

(85) $[_{FocP}\ Op^{EXH}_{[iFOC]}\ Csak_{[uFOC]}\ [_{VP}\ hívta\ fel\ [Op^{EXH}_{[iFOC]}\ csak_{[uFOC]}\ EMILT]]]$

5. Parameters

(86) Although preliminary and at some points rather sketchy, the above observation indicate that the FFF hypothesis seems to be correct. This confirms the flexible status of formal features [i/uF]'s and therefore of functional heads F°.

(87) The flexible status of formal features has serious consequences for theories that take parameters to be properties encoded at the lexical level (the Chomsky-Borer conjecture (Borer 1984; Chomsky 1995)). If formal features are not part of UF, so aren't functional heads and functional heads can no longer be thought of to host the information that L1 learners need to work through in order to set their grammar's particular parameters.

(88) Take for instance the NC parameter (a language exhibits DN/NC). This cannot be reduced to a property of Neg°, since there is no Neg° in DN languages. Apparently, such a setting of this parameter seems to be a result from a L1 acquisition decision not to formalise [NEG]. NC results from the choice to formalise [NEG] into [i/uNEG].

(89) Apparently parameters are first properties of semantic features, and later on, once that several of them are formalised, properties of functional heads.

(90) Moreover, the parameter '(don't) formalise [F]' already is given by the FFF hypothesis and does not have to be assumed as in independent element of UG. A parameter is thus not a UG parameter but follows as a by-result of the fact that L1 learners have to decide whether a particulars semantic feature [F] must be reanalysed as [i/uF], a choice that the L1 learner is forced upon as a result of conflicting interface conditions. I.e. it can be reduced from the SMT.

(91) Under this view parameters are thus not thought to be primitives of UG, but they are derived notions, that derives from the language's task to express semantic operators using a particular strategy and the (derived) fact that there are multiple strategies due to mismatching interface conditions. Note that the conclusion that parameters are derived has also been suggested by (Roberts and Roussou 2003), motivated on independent grounds.

(92) Ultimately, it is an attractive hypothesis that the range of parametric variation can be explained as a result of conflicting interface conditions. Obviously, at this very moment this idea has only the status of an hypothesis and further research is required.

6. Conclusions

(93) In this paper I have tried to argue that the fact that grammar is a maximally optimal solution to interface conditions and that these interface conditions are conflicting. I thus tried to explain different grammatical phenomena as a result of these conflicting conditions.

(94) I have argued that dislocation effects stem from phonological requirements in order that enable spelling out of multiple markers in one position. Furthermore I have argued that extra structure, generated through dislocation effects, always requires the presence of formal features.

(95) I have argued that the set of formal features is not part of UG and should thus be acquired throughout L1 acquisition.

(96) I formulated the empirically testable FFF hypothesis that says that doubling properties with respect to F for the cue to reanalyse the semantic feature [F] as a formal feature [i/uF]. This predicts the following universal:

(97) Overt F° → F-Concord/Doubling

(98) I have shown that (97) seems to be correct for cases of negative, modal and focal concord and thus should not be dispensed with immediately.

(99) I finally have argued that given the flexible status of formal heads, parameters cannot anymore be said to reduce to properties of functional heads. Rather I assume that parameters follow as a result of having to choose between multiple (optimal) marking strategies for semantic operators. Under this view parameters are a derived notion and not part of UG.

(100) Ultimately, the entire range of parametric variation is hypothesized to follow from conflicting interface conditions, i.e. straightforwardly from the SMT.

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