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Towards a Theory of Functional Features in the C-Domain

1.   Licensing and Projection of Features

In this paper we work on the question how functional features (FFs) are projected and interpreted and how syntactic constituents in general are licensed in a structural description (SD). We want to develop an interface model of syntax and semantics where licensing and interpretation of FFs in syntax are directly correlated. We focus on the representation of FFs in the domain of C°.

1.1.   Dependencies of Semantic Features

The most basic generativist idea of licensing by interpretation concerns the presence of elements at the logical form (LF) of a sentence.

(1) Principle of full interpretation   (CHOMSKY 1986)
      Elements at LF must be licensed by an interpretation.

We want to make this principle more specific, assuming that interpretation is not atomic but applies to the coherent entity which a sentence (S) represents. Therefore, the interpretations of elements must structurally converge. We suggest that everything on LF must be formally licensed by a dependency relation.

(2) Convergence of Interpretations   (cf. ÖHL, forthcoming)
      Elements at LF must be licensed by a well formed dependency (WFD).

In their paper on tense binding, ROBERTS & ROUSSOU (to appear, 9) build on a framework using the concept of a structural dependency in minimalist terms.

(3) a) (α, β) is a WFD iff:
      i. α asymmetrically c-commands β;
      ii. there is some feature F such that α and β share F;
      iii. there is no γ such that γ asymmetrically c-commands β but not α.

    b) If $(\alpha_l ...\alpha_n)$ is a WFD and $(\beta_m ... \beta_k)$ is a WFD and (α_n, β_l) satisfies 3a), then $(\alpha_l ... \beta_m)$ is a dependency.

For them this means that the formal representations of SPEECH TIME, REFERENCE TIME AND EVENT TIME (cf. REICHENBACH 1947) (i.e, C c-commanding I c-commanding V) form a WFD due to their temporal features, if both the dependency C and I and I and V are well formed.
     Since LF-interpretation of dependencies always applies to the highest member, this FF must also have a PF (phonological form, i.e. lexical) interpretation in order to be transparent. ROBERTS & ROUSSOU (to appear, 9) term this as

(4) Recoverability of Dependencies
      In a dependency Dep = $(\alpha_l ... \alpha_n)$, where the PF of $[_{\alpha i}\ F]$ asymmetrically c-commands all PFs $[_{\alpha j>i}\ G]$, Dep must be interpreted as an F-dependency.

There are two ways of licensing temporal Fs in a SD. The highest one must be licensed by its function in speech, the lower ones must fulfil the conditions on a WFD. Since we think this applies to all kinds of FFs, we term it as follows:

(5) **Semantic features of clauses can be licensed by**
     a) illocutionary force (e.g. speech time and mood $\leftrightarrow$ independent reference)
     b) co-membership in a well formed dependency

In ÖHL (forthcoming) we extend the model of tense binding to subordinate clauses (SubCs). SubCs constitute a logically complete tense dependency which is subordinate to the tense dependency of the matrix clause (MC). We conclude that there are two different FFs represented by C. Only in MCs it can be said to represent SPEECH TIME. C in SubCs is bound by matrix V. For differentiation we label this "anaphoric" FF lexicalised by a complementiser (CMP) C_{SUB}.

   Since C has autonomous realisation only in SubCs, we keep on labelling clauses introduced by a CMP CPs. If the C-Domain of the matrix has a lexical instantiation, it is always together with other FFs like focus extension or clause mood. We will try to consistently name phrases after the predominant FF.

   Tense of the complement is both interpreted and licensed through CO-MEMBERSHIP in the tense dependency of the matrix. The same applies to modal Fs. C in MCs represents independent reference of tense and clause mood (Q for "interrogative" in the clauses below). C_{SUB} represents dependent reference of tense and mood. FFs of the SubC must be licensed by selection. Selection is binding of C_{SUB} by root V and links the SubC dependency to the MC.

(6) $[_{IP}$ *I hoped$_i$* $[_{CP}$ *that$_i$* $[_{IP}$ *he* $[_{I'}$ *will$_i$* $[_{VP}$ *come$_i$* $]\cdots]$ (SubC FUT relative to TMC)

(7) $[_{IP}$ *I wondered$_i$* $[_{CP}$ *whether$_i$* $[_{IP}$ *he* $[_{I'}$ *would$_i$* $[_{VP}$ *come$_i$* $]\cdots]$ (Q selected by V_{MC})

Unselected embedded questions (discussed in FORTMANN (1994), ADGER&QUER (1996) and ÖHL (forthcoming)) show that even certain verbs normally not selecting interrogatives are licensed to select the modal FF Q in the SubC if they are co-member in a modal dependency headed by Q.

(8) a) $[_{ModP}$ $[_{Mod'}$ *did$_i$* $[_{IP}$ *he* $[_{VP}$ *say$_i$* $[_{CP}$ *whether$_i$* $[_{IP}$ *everyone* $[_{IP}$ *would$_i$* $[_{VP}$ *come$_i$* $]\cdots]$

     b) $[_{ModP}$ *When$_i$* $[_{Mod'}$ *did$_i$* $[_{IP}$ *he* $[_{VP}$ *tell$_i$ you* $[_{CP}$ *whether$_i$* $[_{IP}$ *everyone* $[_{IP}$ *would$_i$* $[_{VP}$ *come$_i$* $]\cdots]$

This shows that the notion of WFD plays a crucial role in licensing semantic Fs and suggests that selection is a subtype of the dependency relation. The examples also show that lower members of the WFD can PF-interpret the FF heading the WFD, if it is not lexically specified for autonomous realisation. In languages like English and German, a finite form of the Verb can interpret Q in C. In other languages, like Persian, there are specific particles (PRTs) lexicalising this F.

(9) a) $[_{ModP}$ *does$_i$* $[_{IP}$ *he* $[_{I'}$ t$_i$ $[_{VP}$ *study linguistics* $]\cdots]$? $\Rightarrow$ T PF-interprets Q

     b) $[_{ModP}$ *studiert* $[_{VP}$ *er Linguistik* t$_i$ $]]$? $\Rightarrow$ V PF-interprets Q
        studies– he – linguistics

     c) $[_{ModP}$ *aya* $[_{VP}$ *u zabanshenasi mikhanad*$]]$?   (Prs.)
        Q – he – linguistics – studies $\Rightarrow$ Q lexically specified

1.2. Realisation of Fs

Our concept of F-realisation in a SD is based on the idea of interpretation by the cognitive modules interfacing with syntax at the output, i.e. LF and PF. All Fs constituting the intension of S must be interpreted at LF; we think that in order to fulfil this condition, they must be identified – either by a specific PF interpretation or by other, maybe idiosyncratic, properties of SD.

The most direct way to interpret FF is by giving it a lexical entry with a specific PF. In this case FF is expressed as a word, like Q in the Persian example. However, there is much evidence in the languages of the world that often several FFs are projected in bundles and realised by one word. We call this the

(10) <u>Principle of Feature Syncretism</u>   (ÖHL 2000, forthcoming)
Functional features can syncretise in one functional head, if they are neighbours in a logical hierarchy.

On the other hand, FFs that occur in a syncretic head in one language may be scattered over several ones in another. This phenomenon has been called the

(11) <u>Feature Scattering Principle</u>   (GIORGI & PIANESI 1997, 15)
Each feature can head a projection.

One very clear example for this variation is a minimal pair from again Persian, where the F Q is lexicalised as the specific PTC *aya* under the general CMP *ke*, and English, where both the CMP-features and Q are expressed by one word *if*.

(12) a) *Man nemidanam **ke aya** u zabanshenasi mikhanad.*   (Prs.)
I – wonder – CMP – Q – he – linguistics – studies

b) *I wonder **if** he studies linguistics.*

If we take into account the FF responsible for PF interpretation of WH-operator scope over the Θ-variable, we find that it is not realised at the top of the embedded clause in Persian, as it is in English. Persian WH-pronouns stay IN SITU. On the other hand, English does not have a CMP in embedded WH-clauses.

(13) a) *Man nemidanam* $[_{CP} (WH_i) [_{C'} ke [_{ModP} aya [_{VP} u chi_i mikhanad] \cdots]$ (Prs.)
I – wonder – CMP – Q – he – what – studies

b) *I wonder* $[_{CP} what_i [_{IP} he [_{I'} (T) [_{VP} studies x_i] \cdots]$

Our analysis accounts for the data as follows: Whereas fronted ***what*** in English PF-interprets all three FFs WH, C_{SUB} and Q, the latter are PF-interpreted by three lexically specified elements in Persian. For differentiation, we suggest that the Q-PTC is head of a modal phrase (MODP) which is syncretised with CP in English.

We think that the WH-operator in Persian must have the same scope over the clause it has in English, and thus the same LF-interpretation. However, its PF-interpretation takes place in situ by means of a chain between the two items. A similar account can hold for the asymmetries between the position of V_{FIN} in English and French. In English, only V not assigning Θ-roles to arguments (i.e. auxiliaries and modals) (cf. ROBERTS 1985, 30; POLLOCK 1989, 385) are in the I position. Main verbs stay IN SITU, expressing 'I' morphologically.

(14) a) *I knew* [$_{CP}$ *that* [$_{IP}$ *the boy* [$_{I'}$ *would$_i$* [*gladly* [$_{VP}$ *study$_i$ linguistics*]]···]

  b) *I saw* [$_{CP}$ *that* [$_{IP}$ *the boy* [$_{I'}$ *I°$_i$* [*gladly* [$_{VP}$ *studied$_i$ Linguistics*]]···]

In French, main V are also spelt out in the position of I°. However, there is the same chain relation as in English, holding between I° and V°, the logical position of the Θ-assigning predicate. 'I' is in both cases expressed as an affix to V. Their common PF-interpretation can take place in either position. Moreover, French has evidence for feature scattering of agreement and tense (cf. GIORGI & PIANESI 1997). Therefore, V agreeing with the subject are spelt out in a position higher than infinitivals, which are, however, also spelt out higher than V, i.e. in T°.

(15) a) *Je sais* [$_{CP}$ *qu'* [$_{AgrP}$ *il* [$_{Agr'}$ *va* [$_{TP}$ *étudier* [*enthusiastement* [$_{VP}$ t$_i$ *la linguistique*]···]

The principles can be summarised as follows:

(16) PF – Interpretation of FFs (F*) (adapted from ROBERTS & ROUSSOU (to appear, 9) who use the terms MERGE α and MOVE α; more modifications fitting their model to our representational one have been made.)

  a) SPELL **α**: Lexicalisation through an item expressing F, which is inserted as a head F°In this case F* takes place as a word.

  b) SPELL **(α+x):** α is part of a bundle of Fs parametrically specified to have PF interpretation as one term.

  c) SPELL **ch(α+x)**: F°, the extension of X°, heads the chain F° - X°. The whole chain is spelt out in one parametrically specified position of the chain. In this case F* takes place as an affix of X° or within an XP being in chain relation with **α**.

As examples we give once again the realisations of V and its inflecional categories in English and French.

(17) a) The aspectual AUX *have* in the following sentence is representing one single F as scattered head (SPELL **α**):

  *John will soon **have** read the books.*

  b) In the same sentence, Future tense **T** and **AGR** are specified for PF realisation by SPELL **(α+x)** in modern English.

  *John **will** soon have read the books.*

  c) Present tense I, AGR and V are specified for PF realisation by SPELL **ch(α+x)** in both modern French and English. Once PF-interpretation takes place in a higher position, hence in a lower one.

  *Jean **lit** souvent des livres.*
  *John **I•** often reads books.*

2.   The role of CMPs

Speaking of FFs in the C-domain, one should wonder what function the CMPs generated there fulfill in the first place (besides C$_{SUB}$).

2.1.   CMP-drop and Embedded Topicalisation

What is striking is that there are languages which can drop the CMP in contexts of embedded topicalisation. So is Norwegian, where only embedded V2 also allows for CMP-drop. V not embedding V2 do not allow for CMP-drop either.

(18) a) *jeg hevder* (*at*) *gutten studerer lingvistikk*   (Nw.)
      I - claim -1stsg – CMP – boyDET – studies – linguistics

    b) *de sier* (*at*) *gutten studerer lingvistikk*
      they – say – CMP – boyDET – studies – linguistics

(19) a) *jeg forventer* *(*at*) *gutten studerer lingvistikk*
      I - expect -1stsg – CMP – boyDET – studies – linguistics

    b) *jeg er overrasket over* *(*at*) *gutten studerer lingvistikk*
      I - am-1stsg – amazed – about – CMP – boyDET – studies – linguistics

In Russian, embedded topicalisation an CMP-drop is also restricted to certain V.

(20) a) *Ja skazala,* (*čto*)   *mal'čik izučajet lingvistiku.*   (Rus.)
      I – said   –   that – boy – studies – linguistics

    b) *Ja videla,* (*čto*)   *on   izučal   lingvistiku.*
      I – saw   –   that – he – studied – linguistics

(21) a) *Ja ožidaju* (expect), *(*čto*) *mal'čik budet izučat' lingvistiku.*

    b) *Ja byl udivljën* (am surprised), *(*čto*) *mal'čik izučajet lingvistiku.*

Embedded V2 in German obligatorily drops the CMP.

(22) a) *ich behaupte, Linguistik studiert der Junge*   (Gm.)
      I - claim – linguistics – studies – DET – boy

    b) *sie sagen, Linguistik studiert der Junge*
      they – say – linguistics – studies – DET – boy

Verbs not embedding speech do not allow for CMP-drop, however.

(23) a) **ich erwarte, Linguistik studiert der Junge*
      I – expect – linguistics– studies – DET – boy

    b) **ich bin überrascht, Linguistik studiert der Junge*
      I – am – amazed – linguistics– studies – DET – boy

We want to argue that the clue for this is that V select for a nominal category they case-govern. Selected object clauses must have a CMP since it is of the category [+N][1]. Θ-clauses therefore must get a F [+N] from their CMP.

2.2.   Governed vs. Ungoverned Complement Clauses

V licensing V2 are roughly <u>V of saying and thinking</u>, therefore licensing indirect speech. We suggest that SubCs without CMPs are not CPs selected by V, but

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[1] The idea that C° is a potentially nominal head goes back to KAYNE (1984); cf. MÜLLER & STERNEFELD (1990, 37ff).

actually coordinated or adjoined matrix clauses (i.e. extensions of VP, e.g. FOCP) (a similar proposal only for Gm. has been made by REIS, 1997).

(24) a) *Ich sah,* [CP *daß* [IP *der Junge Linguistik studierte*]···]
    I – saw – CMP – the – boy – linguistics – studied

  b) *Ich wußte,* [FOCP *Linguistik* [FOCP' *wird* [IP *der Junge studieren*]···]
    I – knew – linguistics – will – the – boy – study

We think that this is the reason why V2 clauses are grammatical only if they follow the matrix: Coordinate S is not embedded and therefore cannot topicalise.

(25) a) *Ich bin mir sicher, er ist ins Kino gegangen.*
    I – am – myselfDAT – sure – he – is – into-DET – cinema – gone

  b) **Er ist ins Kino gegangen, bin ich mir sicher.*
    he – is – into-DET – cinema – gone – I – am – myselfDAT – sure

  c) *Dass er ins Kino gegangen ist, bin ich mir sicher.*

This is in contrast to a proposal made by STOWELL (1981), who claimed that dropped CMPs are ∅ on PF, which is exceptionally licensed in governed position. However, in both German and Persian, only full CPs can be embedded in Θ-position. In Persian, this makes a DET and an ACC-particle obligatory.[2]

(26) a) **Ich habe* [FocP *das stimmt*] *nicht geglaubt.*
    I – have – this – is-right – not – believed

  b) *Ich habe* [CP *daß das stimmt*] *nicht geglaubt.*
    I – have – that – this – is-right – not – believed

(27) a) *Man midanam* ([CP *ke*) [FocP *gorbe-ha shir doost darand*]]. (Prs.)
    I – know – CMP – cats – milk – like – have

    'I know that cats like milk'

  b) *Man* [DP *in* [CP *ke* [IP *gorbeha shir doost darand*]] ***ra***]] *midanam.*
    I – this – CMP – cats – milk – like – have – ACC – know

This means both in German and Persian CMP-drop is allowed only in extraposed clauses. The Persian data not only indicate that clauses in Θ-position must have an overt CMP, but that it is also an overtly case marked category [+N]. Dropped CMPs are not just PF-∅, but lack the FF relevant for being case governed.

2.3. Subject Clauses

The categorial F [+N] of CMPs is in our view also made evident by the fact that in many languages sentential subjects must be preceded by a DET.

(28) a) *In ke   u zabanshenasi mikhanad zarar nadarad.* (Prs.)
    this – CMP – he – linguistics – studies – harm – NEGhave

    "That he studies linguistics does not do any harm."

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[2] On the status of ***ra*** as a case marker cf. LOTFI (1997).

b) *In ke u raghsid ma ra khandand.*
　　this – CMP – he – danced – we – ACC/DEF – made-laugh

　　"That he danced amused us."

(29) *To ka viņš dejoja mums patika* 　　　　　　　　　　　　(Latvian)
　　this − CMP − he − danced − usDAT − amused

(30) *To óti spudázi glossología, den vlápti.* 　　　　　　　(Greek)
　　DET – CMP − studies − linguistics − NEG – harm

In other languages, too, CMP in subject clauses must never be dropped.

(31) a) *(*čto*) *on tanceval, nas razvleklo.* 　　　　　　　　(Rus.)
　　　CMP – he – danced – us – amused

　　b) [CP *(*Qu'*) *il dansait* [IP *a* [VP *amusé les étudiants*]···] 　(French)
　　　　　　　　　　CMP − he − danced − has − amused − the − students

　　c) *(*che*) *lui danzasse ci ha divertiti* 　　　　　　　　(Italian)
　　　CMP – he – danced SBJ – us – has – amused

　　d) *(*That*) *he danced, amused us*.

(32) a) **Er ist ins Kino gegangen, stimmt.*
　　　he – is – into-DET – cinema – gone – is-true

　　b) *Dass er ins Kino gegangen ist, stimmt.*

This follows naturally assuming that clauses in Θ-position must have a CMP.

2.4. 　Selection and Case

It is widely acknowledged in generative grammar that Θ-positions are also case positions. This has been expressed in terms of licensing of chains.

(33) <u>Case Principle</u> 　　　　　　　　　　　　　　　(cf. ROBERTS 1997)
　　Every realised DP/ NP must be assigned abstract case. A chain is visible for Θ-marking if it contains a case-position.

Since it is implausible that only CP-arguments should be exempt from this principle, we suggest a slight reformulation in terms of licensing of Θ-roles.

(34) <u>Case Principle</u> (reformulated) 　　　　　　　　　(cf. ÖHL, forthcoming)
　　In order to be licensed in SD, every Θ-role must be visible for assignment of abstract case.

It is striking that sentential arguments must not lack a specific CMP in languages assigning case to them, like Persian or Japanese.

(35) **Man* [DP *in* [CP *(*ke*) [IP *gorbeha shir doost darand*] *ra*] *midanam.*
　　I – this – CMP – cats – milk – like – have – ACC – know

Jps. has different CMPs, among them a factive (*koto*) and a neutral one (*no*).[3]

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[3] Both PTCs have traditionally been called "nominalisers", especially since they are assigned case (cf. JOSEPHS 1976, 313ff). This is no counterevidence in our framework. Since CMPs are

(36) a) *Watashi wa kare ga benkyo shi-ta* **(koto) o** *shira-nakat-ta.*
I − TOP − he − NOM − study − doPST − CMP - ACC − know-NEG-PST

"I did not know that he studies."

b) *watasi wa anata ga gengogaku o benkyosi-nai* **(koto) o** *youkyusu-ru*
I – TOP − you − NOM − linguistics − ACC − studyNeg − CMP − ACC − demand

"I demand that you don't study linguistics."

(37) a) *Mary wa John ga koohii o nomu* **(no) o** *mi-ta*
Mary − TOP − John − NOM − coffee − ACC − drinkPRS − CMP − ACC − seePST

"Mary saw that John drank coffee".

b) *Mary wa John ni jibun ni hana o motteku-ru* **(no) o** *tanon-da*
Mary −TOP − John - DAT − her(self) − DAT − flower − ACC − bringPRS − CMP − ACC − askPST

"Mary asked John to bring her flowers."

That a CMP is necessary to license a (finite) clausal argument can thus be explained if we assume that only nominal categories can receive case and that therefore VP/ IP have to be selected by a CMP as a nominal category. In Japanese, which normally case marks all sentential arguments, exactly with those verbs allowing for CMP-drop in the languages treated above, case marking is not obligatory. In this case, another introducing particle *to* is used.

(38) a) *Noam Chomsky wa ningen no gengo nouryoku wa umaretsukinomono*
dearu **to** *i-u.*
N.C. − *TOP* − human − *GEN* − language − facility − *TOP* − innate-thing − be*PRS* − *CMP* − say

b) *watasi wa sono syonen ga gengogaku o benkyo-siteiru* **to** *it-ta*
I −TOP − this − boy − NOM − linguistics − ACC − studyIPF− CMP − sayPST

We assume that *to* is not a CMP but a marker of indirect speech, and that like German V2 clauses, *to*-clauses are not selected but adjoined.

2.5.   Languages without CMPs

There are two languages in our corpus which do not have CMPs. According to our analysis this should mean that they do not have selected clauses.

Bengali does not have a CMP but a subordination particle which can also occur clause initially (see .b below).

(39) a) *Ami bol-lam* **je** *chele-TA lingwistiks pORe.*
I − said − SUB − boyDEF − linguistics − studies

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there to give clauses a F [+N], all CMPs are in fact "nominalisers". Note also that all CMPs in Indo-European go back to nominals (cf. BRUGMANN 1904, 641ff).

b) *Ami bol-lam chele-TA **je** lingwistiks pORe*.

In fact, unlike Persian, Bengali object clauses cannot be in their Θ-position which precedes V in this SOV language. Subject clauses cannot either, but are always left-dislocated. The Θ-position is obligatorily occupied by a resumptive.

(40) a) *Ami* [IP *chele-TA **je** lingwistiks pORe*] *bol-lam*.

    b) *o   je   nachlo, *(sheTa) amaderke hashalo*.
       he − SUB − danced − this − us − amused

The other language without CMPs is Chinese. One striking consequence is that there are no subject clauses in Chinese. English hypotactical constructions with subject clauses are always paratactically paraphrased in Chinese.

(41) a) *Ta tiaowu, women juede haoxiao*.
       he − dance − we − feel − funny

       'That he danced amused us.'

    b) *Ta lai le, women zhen   jingya*.
       he − come − PRF − we − really − surprised

       'That he came surprised everyone.'
       (Lit: He has come, we are really surprised'.)

    c) *Chuanghu kai zhe, wo hen haipa*.
       window − open − DUR − I − very − scared

       ' That the window was open frightened me.'
       (Lit: The window is/ was open, I was/ am very scared.)

Constructions with apparent object clauses can also be analysed as conjuncts. There is only one genuine hypotactical construction in Chinese with ECM-verbs. This is indicated by long distance topicalisation, which is obligatory in ECM constructions but impossible, if there are two conjuncts. The latter allow for short distance topicalisation, which the former do not.

(42) a) *Wo yao   ni   lai   kan   **zheitao   yifu***
       I − want − you − come − look − this-outfit − clothes

       'I want you to come and look at this outfit.'

    b) **Wo yao **zheitao yifu** ni lai kan*

    c) ***zheitao yifu** Wo yao ni lai kan*

(43) a) *Wo (jiu) zhidao neige nanhaizi hui du **yüyanxue***.
       I − PST − know − DET − boy − will − read − linguistics

    b) ***Yüyanxue** wo (jiu) zhidao neige nanhaizi hui du*.

    c) *Wo (jiu) zhidao **yüyanxue** neige nanhaizi hui du yüyanxue*.

This makes it evident that "finite embedding" as genuine selection does not exist in either Chinese or Bengali. Both lack clauses in Θ-position, since they do not have heads [+N] they can assign case.

3.   Conclusion

We have shown that CMPs play a crucial role in clauses that are governed. We think that this is grounded on the fact that there must be a nominal category in C that can be assigned abstract case. Other Fs in the C-Domain are modal Fs like Q or the FF of a logical operator like WH. The principles of syncretism and scattering of Fs determine how many potential representations as heads are possible at the top of the clause, i.e. in the C-Domain. In addition, it is parameterised whether two heads related by a WFD are PF interpreted separately or in just one position. Typological language variation like WH-movement vs. WH-in-situ or verb fronting vs. Q-particles follows from the latter. Whether there are specific CMPs for clauses of the type Q depends on the presence of a Q-particle of the category [+N] in the lexicon which can be assigned case – i.e., Q and [+N] must be syncretised. If they are scattered, there will be a Q-particle under the CMP, like in Persian.

4.   Literature

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