The *Final-over-Final Condition*: Not a syntactic universal*

Waltraud Paul
Centre de recherches linguistiques sur l'Asie orientale, CNRS-EHESS-INALCO

Abstract

The *Final-over-Final Condition* (FOFC) (Sheehan, Biberauer, Roberts, and Holmberg 2017) purports to be a universal word order constraint. In this article, we challenge this claim and demonstrate that the FOFC is of a statistical nature: It is a *relativized,* non-absolute version of cross-categorial harmony, where only a head-final projection dominating a head-initial projection is ruled out among the disharmonic configurations displaying different head directionalities. The cross-categorial generalizations in the *World Atlas of Languages*, referred to by Sheehan et al. (2017) in order to illustrate the crosslinguistic validity of the FOFC, are shown to be useless for determining head-directionality, given that they systematically gloss over functional categories. The Mandarin Chinese head-*final* split CP dominating a uniformly head-*initial* extended verbal projection and TP serves as a case study here, because it has challenged the FOFC since its very beginning. The numerous efforts to make the Chinese CP "FOFC-compliant", the latest being Biberauer (2017), are shown to be unsuccessful and to ignore well-established principles of Chinese syntax. The data from Chinese thus add to the evidence from other languages likewise undermining the FOFC.

1. Introduction

The *Final-over-Final Condition* (FOFC) (cf. successive versions by Biberauer, Holmberg, and Roberts (BHR) 2008, 2009, 2014 over the last decade, with Sheehan, Biberauer, Roberts, and Holmberg 2017 as the latest publication), has attracted a lot of attention and also figured among the *mid-level generalizations of generative linguistics* (cf. Leivada 2020 and references therein). However, as to be demonstrated here, it does not have its place among these generalizations, both for theoretical and empirical reasons.

While the FOFC is presented as a "syntactic universal, an automatic consequence of how some of the most fundamental operations in syntax and morphology/phonology interact" (Sheehan et al. 2017: 3), it will be shown to be a refined version of the Head Parameter and a *relativized,* non-absolute version of cross-categorial harmony (CCH), insofar as not all disharmonic configurations displaying different head directionalities are ruled out:[1].

> *Final-over-Final Condition* (Biberauer 2017: 190, (5))
>
> "A head-final phrase αP cannot dominate a head-initial phrase βP,
> where α and β are heads in the same extended projection (cf. BHR 2014)."

While a head-*initial* projection can either dominate a head-*initial* or a head-*final* projection, a head-*final* projection can only dominate another head-*final* projection.

Given the numerous successive versions of the FOFC and the somewhat heterogeneous points of view presented in the individual chapters of Sheehan et al. (2017), there exists some confusion about the precise status of the FOFC: a syntactic, surface or processing constraint, a syntactic universal etc.[2] The authors themselves (BHR 2008, 2009, 2014; Sheehan et al. 2017) are not always consistent in their presentation of the FOFC, either. For the purposes of this article, I choose the version in the citation above

* I would like to thank both reviewers for their constructive comments, which led to a much improved final version.

[1] BHR (2014: 170) explicitly take the FOFC "to be both a hierarchical *and* a cross-categorial universal".

[2] According to Reviewer 2, for example, the FOFC in Sheehan et al. (2017) is not meant to be a constraint itself; instead it is a set of constraints that leads to the FOFC pattern. S/he refers to Holmberg's chapter 4 in Sheehan et al. (2017) and to BHR (2014) for an account based on Kayne's (1994) *Linear Correspondence Axiom* (LCA). Cf. section 4.1 below for problems with this account. Also cf. Leivada (2020) and Clem (2022) for a critical appraisal of the FOFC *qua* universal.

 Nordlyd 48.1: 1-23, Special issue on Extended Projections, edited by Peter Svenonius.
Published at the University of Tromsø – The Arctic University of Norway.
http://septentrio.uit.no/index.php/nordlyd https://doi.org/10.7557/12.7972

with the FOFC as a syntactic universal, which likewise figures prominently in the title of Sheehan et al (2017).

Sections 2 and 3 discuss the conceptual problems of the FOFC and highlight its internal contradictions. Section 4 presents a detailed analysis of the Mandarin Chinese head-*final* split CP, which has been a challenge for the FOFC since its very beginning, because it dominates a uniformly head-*initial* extended verbal projection up to and including TP. The numerous efforts by BHR over the last decade (BHR 2008, 2009, 2014), and in particularly the one by Biberauer (2017), to make the Chinese CP "FOFC-compliant" are shown to be unsuccessful and to ignore robust insights and well-known basic principles of Chinese syntax. In conclusion (section 5), the data from Chinese thus add to the evidence from other languages likewise challenging the empirical basis of the FOFC. The FOFC is at best a "statistical universal", not a component of universal grammar.

2. The irrelevance of typology for grammatical theory[3]

While it is correct that a number of observations underlying the FOFC are drawn from first hand case studies (cf. BHR 2014: §2 and the chapters in Sheehan et al. 2017), the bulk of cross-linguistic evidence for FOFC is based on second-hand knowledge obtained from the literature and especially from Greenberg's (1963) cross-categorial generalizations (CCG) and their extensions in the *World Atlas of Languages* (WALS; cf. Dryer and Haspelmath 2013).[4] However, as is well-known, in establishing CCGs, each member of a correlation pair is taken in isolation, not as occurring in the same extended projection as stated in the FOFC; this largely reduces the relevance of CCGs as evidence for the FOFC. Djamouri, Paul, and Whitman (2013) and Whitman and Ono (2017) explicitly address this tension (cf. section 2.2 below), building on the close examination in Whitman (2008) of the precise status of CCGs in both Greenberg (1963) and their extensions in WALS.

2.1 Whitman's (2008) classification of Greenberg's (1963) universals

Like Newmeyer (2005), Whitman (2008) rejects the head parameter as part of universal grammar. He goes a step further and argues that Greenberg's (1963) universals, which underlie the head parameter, are not homogeneous. In fact, there are three different classes of generalizations, only two of which are potential universals and thus contrast with the CCGs:

(1) Constituent order generalizations (universals)
   a. *Cross-categorial generalizations* reference the internal properties of two or more categories irrespective of their relationship in a particular structure.
   b. *Hierarchical generalizations* describe the relative position of two or more categories in a single structure.
   c. *Derivational generalizations* describe the relative position of two or more categories at the end of a syntactic derivation. (Whitman 2008: 234, (1a-c), underlining mine)

Concerning *hierarchical universals*, Whitman (2008: 235) adds: "I have defined hierarchical and derivational universals in (1b-c) in such a way that the latter are actually a subcase of the former. In practice, I will restrict *hierarchical universals* to cases where *underlying constituent order* is key to explaining Greenberg's generalizations" (emphasis mine, WP).

[3] I borrow here Newmeyer's (2005: 103) irresistible title of his chapter 3.

[4] Reviewer 2 contests that Greenberg's CCGs are relevant for the FOFC. This is not my reading, given the passages cited in the remainder of the article (e.g., at the end of section 3.1) where Sheehan et al. (2017) and Biberauer (2017) directly refer to CCGs in Greenberg and WALS as evidence. An electronic search in Sheehan et al. (2017) confirms this: works by Dryer are mentioned 127 times in the text; among the many publications by Dryer, the bibliography also features the references Dryer (2015a) - (2015i), which all refer to constituent orders documented in WALS (e.g., adposition and noun). WALS itself is mentioned 16 times, and *Greenberg(ian)* 80 times. Finally, BHR (2014: 170) take the FOFC "to be both a hierarchical *and* a cross-categorial universal" (emphasis in the original, WP).

2.1.1 Cross-categorial generalizations

Among the 25 syntactic universals proposed by Greenberg (1963: 110–113), 14 involve CCGs, as exemplified by universals 3 and 4.

(2) a. Universal 3
Languages with dominant VSO order are always prepositional.

b. Universal 4
With overwhelmingly greater than chance frequency,
languages with normal SOV order are postpositional.

Irrespective of whether they are presented as statistical (*with overwhelmingly greater than chance frequency*) or as absolute (*always*), the crucial property of CCGs underlying the concept of cross-categorial harmony (CCH) is that they "reference the internal properties of two or more categories irrespective of their relationship in a particular structure" (Whitman 2008: 234). The main idea was that CCGs – based on the comparison of languages – enable the linguist to predict properties from the basic word order type itself (VSO, SVO, SOV), without ever having encountered any adposition in the language at hand. However, since their formulation by Greenberg (1963), the CCGs have been weakened by the increasing sample of languages examined. WALS has six VSO languages with postpositions, thus adding to the one counter-example cited by Greenberg (1963: 107) (cf. Whitman 2008: 238), and there are eleven SOV languages with prepositions (including the four SOV/Prep languages mentioned by Greenberg 1963: 105, note 8 himself).[5]

If CCGs are not part of grammar, how can we then explain their relative statistic weight? According to Whitman (2008), the key to this statistical predominance is to be found in language change (itself subject to contingency). For example, if a given language exclusively reanalyses adpositions from verbs, we obtain prepositions for VO languages and postpositions for OV languages, the adpositions maintaining the hierachical relation between head and complement of their verbal source (cf. Whitman's 2000 *Conservancy of structure constraint*). However, if – as is the case in Chinese – adpositions are not only reanalysed from verbs (head-initial), but also from nouns (head-final), we obtain a "mixed" category adposition with both prepositions and postpositions (cf. Djamouri, Paul, and Whitman 2013).

Visibly, reanalyses from a verbal source are common enough across time and languages to have been noted as a typological tendency since Greenberg (1963). Accordingly, cross-categorial harmony is a linguistic phenomenon and not due to extralinguistic, cognitive factors (*pace* Leivada 2020, Grohmann and Leivada 2020). On the other hand, reanalyses from non-verbal sources are attested as well, as witnessed by the "exceptions" to CCH; the simple fact that these "exceptions" increase with the number of languages examined in typological surveys puts forward the fundamentally statistical nature of CCH.

2.1.2. Hierarchical generalizations

Universals 1 and 14 are the only cases in Greenberg (1963) that illustrate a *hierarchical generalization*:

(3) a. Universal 1
In declarative sentences with nominal subject and object,
the dominant order is always one in which the subject precedes the object.

b. Universal 14
In conditional statements, the conditional clause precedes the conclusion
as the normal order in all languages.

[5] The feature 85A *Order of adposition and noun phrase* in WALS (cf. https://wals.info/chapter/85, accessed on 2023-10-09) is to be taken with a lot of caution; German, for example, figures among the fifty languages described as "prepositions/no dominant order" and is incorrectly said to lack postpositions. Cf. Djamouri, Paul, and Whitman (2013) for PostPs with a PreP complement in Chinese and German [$_{PostP}$ [$_{PrepP}$ Prep DP] Postp°] as another challenge to the FOFC.

While these universals are formulated in terms of linear order, they can be transposed into a hierarchical structure. "Universal 1 follows, at an appropriate level of representation, if (i) subjects originate in the specifier of a projection that contains the object and (ii) specifiers always precede their heads, as in (2) [=(4) below]" (Whitman 2008: 235).[6]

(4) [S Specifiers [VP precede heads and complements]]

Likewise, the conditional clause occupies a higher position than the consequent clause, when at an appropriate level of representation conditionals are generated in the specifier position of a projection that contains the consequent clause:

(5) [S If conditionals are specifiers of S' [S they precede the consequent]]
(Whitman 2008: 235, [3])

As emphasized by Whitman (2008: 235), the notion of "appropriate level of representation" is important here, because as is well-known, universals 1 and 14 do not hold as absolute universals about *surface order* across languages; they are shown, though, to be accurate as generalizations about underlying constituent order (cf. Whitman 2008: 248-251).

2.1.3. Derivational generalizations

The notion of "appropriate level of representation" is also crucial for *derivational generalizations*, where the relative position between two categories is obtained as the result of movement, as in universal 6:

(6) Universal 6
All languages with dominant VSO order have SVO as an alternative
or as the only alternative order.

According to Whitman (2008: 242-243), the derivational relationship between VSO and SVO is directly captured by raising of the verb over the subject (cf. Emonds 1980, McCloskey 1991). When verb raising is blocked as for example in non-finite clauses, we obtain SVO. Universal 6 thus reflects the mapping between two levels of representation which may or may not involve movement.

Whitman (2008) sheds new light on Greenberg's (1963) universals and demonstrates their heterogeneity. Only hierarchical generalizations (Universals 1 and 14) and derivational generalizations turn out to be potential universals, hence "true candidates for principles of synchronic grammar" (p. 233), whereas CCGs are the result of language change and hence of a statistical nature. Accordingly, cross-categorial harmony presents a statistical tendency; it is not a principle of universal grammar.

2.2. Whitman (2008), Djamouri, Paul, and Whitman (2013) and Whitman and Ono (2017) on the FOFC

In addition to the clear stand in Whitman (2008) that CCGs are *not* part of grammar, in subsequent (co-authored) works, the non-universal status of the FOFC is directly addressed. The relevant passages are cited *in extenso* in order to allow a direct comparison with Biberauer's (2017) own statement that the FOFC is a *hierarchical universal* in Whitman's (2008) sense: "[…] particles [e.g., Chinese head-final Cs; WP] more generally do not constitute a threat to the universality of FOFC, *interpreted* (i) as a hierarchical universal (i.e. a constraint on permissible narrow-syntax/ narrow-syntax-internal phrase structure configurations; see Whitman 2008), and (ii) as a constraint that is *relativized to extended projections in the manner stated in (5)* [where (5) is the FOFC itself, WP]" (Biberauer 2017: 190; emphasis mine).

This goes against the letter and the spirit of Whitman (2008), Djamouri, Paul, and Whitman (2013) and Whitman and Ono (2017): "The FOFC proposed by Holmberg (2000) and developed by Biberauer, Holmberg, and Roberts (2008b, 2009, 2010 [published 2014, WP]) rules out certain combinations of head-final and head-initial order across categories, *but it is stated (and motivated) as a derivational generalization.* The FOFC rules out a specific subtype of disharmony: the case where a head-initial phrase

[6] As noted by reviewer 1, in addition, movement of the object to a position higher than the subject must be excluded at the relevant level of representation.

α is immediately dominated by a head-final phrase β, where α and β are nondistinct in categorical features (Biberauer, Holmberg, and Roberts 2010)" (Djamouri, Paul, and Whitman 2013: 94; emphasis mine).

While the FOFC states a relativized form of harmony holding for projections embedded within the same structure, CCGs in Greenberg and its extensions in WALS reference categories in isolation. "Universal 2 is obviously designed to state a generalization about NPs and PPs as *independent* categories, *not about, for example, PPs inside NP*" (Whitman and Ono 2017: 44; emphasis mine).[7] When commenting on Universal 3 ("Languages with dominant VSO order are always prepositional"), Whitman and Ono (2017: 44) again emphasize that in CCGs, "[…] this relationship is claimed to hold regardless of any relationship between clauses and PP."

The strategy adopted by BHR (2014) is characterized by Whitman and Ono (2017: 44 – 45) as follows: "[…] although the FOFC is a constraint on constituent order, it applies to the word order properties of *one constituent embedded within another*; Biberauer et al. are thus able to appeal to the derivational relationship between the two constituents to explain the word order facts. In general, however*, this kind of strategy is not available to explain the kinds of crosscategorial generalizations stated by Greenberg.*[…] From an empirical standpoint, the plausibility of crosscategorial generalizations or principles attempting to capture them such as the Head Parameter as components of Universal Grammar has been undermined by the discovery that *all purely crosscategorial* (that is, *non-derivational) generalizations* of this type appear to be statistical (Dryer 1992; Whitman 2008). They all have exceptions" (emphasis mine, WP).

3. The inherently flawed nature of WALS and head directionality

Evidently, for Sheehan et al. (2017) it is necessary that the FOFC be a hierarchical or derivational universal in Whitman's (2008) sense. While the FOFC is formulated as such, the CCGs in Greenberg and WALS cited as supporting the FOFC are clearly no derivational/hierarchical universals. Moreover, the information concerning head directionality in WALS is inherently flawed and cannot serve as crosslinguistic evidence for the purposes of the FOFC.

3.1. WALS and functional categories

There are no data points for the functional categories (FCs) relevant for the FOFC. The category *complementiser*, for example, the distribution of which is one of the cornerstones of the FOFC, does not figure among the features included in WALS. Instead, one has to fall back on feature 92a "polar question particle" and feature 94a "adverbial subordinator", where polar question particles might in fact comprise interrogative force *heads*.

However, a closer scrutiny of the languages included under feature 92a betrays some serious problems and raises doubts as to the general validity of the data in WALS. More precisely, an extremely well-studied and easily accessible language such as French sees itself classified among languages marking polar questions with sentence-initial "particles" such as the Australian language Mokilese or !Xóõ (Southern Khoisan, Bhotswana), thus apparently presenting the "mirror image" of Chinese with the sentence-final yes/no question *ma*. The "particle" alluded to is *est-ce que* 'is-it that' (cf. Dryer 2008a), whose particle status is maintained despite Dryer's acknowledging the "original" composite status of *est-ce que* ('verb plus demonstrative plus complementiser'). Given the existence of the corresponding negated form 'n*'est-ce* pas *que* + clause' = 'NEG-is-it not that', i.e. 'isn't it that', indicating that the copula *est* in *est-ce que* is clearly identifiable as such, the analysis of *est-ce que* as a particle, i.e. as an X° whose sub-components are opaque to syntactic operations, is controversial (cf. Munaro and Pollock 2005 for detailed analysis). Accordingly, its description as a sentence-initial *polar question particle* appears patently inadequate. That such a misleading analysis is proposed for a well-studied language such as French is disturbing and casts doubt on the accuracy of analyses in the case of languages where only second hand knowledge via consulting grammars is available.

[7] "Universal 2. In languages with prepositions, the genitive almost always follows the governing noun, while in languages with postpositions it almost always precedes" Greenberg (1963: 78).

As for feature 94a "adverbial subordinator", it is a cover term for different categories: clause selecting prepositions in English (*after, before*), complementiser in English (*that, if*), but also *non*-words, i.e. affixes.[8] Nevertheless, Sheehan et al. (2017: 17) take the statistics for *adverbial subordinator* as a direct indicator of the distribution of C and claim: "In sum, the absence (or extreme rarity) of VO…C orders crosslinguistically is the second piece of evidence for FOFC".

3.2. Head-directionality in Japanese and Chinese

The fact that WALS in its correlation pairs often does not take into account *grammatical* items, i.e. functional categories (FC) such as English *'s, of* etc. leads to wrong results for head directionality. *John's book,* for example, counts as 'genitive noun', i.e. as a head-*final* NP on a par with 'adjective noun' as in *good books* and would therefore be expected to pattern with 'O V' (*via* N and V being the relevant heads); in reality, however, [$_{DP}$ *John* [$_{D'}$ [$_{D°}$ *'s*] [$_{NP}$ *book*]]] is a head-*initial* Determiner Phrase (DP). The same holds for the DP in Japanese, a language which since Greenberg (1963) has been known as the *rigid subtype* of OV languages, given its pervasive CCH with respect to head-finality. The OV order is said to be paralleled by the existence of postpositions (to the exclusion of prepositions), by the sentence-final position of question particles and by the order 'XP (*no*) noun' where XP includes modifiers, complement clauses and relative clauses. Both in Greenberg (1963) and in WALS, the conditioned presence of *no* is neglected:[9]

(7) a. [$_{NP}$ kuroi (**no*) boosi]
black D° hat
'a black hat'

b. $_{DP}$ Erika [$_{D'}$ *([$_{D°}$ *no*]) boosi]]
Erika D° hat
'Erika's hat'

(8) [$_{DP}$ yuubokumin [$_{D'}$[$_{D}$ no][$_{nP}$ $t_{yuubokumin}$ [$_{n'}$[$_{DP}$ tosi [$_{D'}$ no [$_{NP}$ t_{tosi} hakai]]]]]]]
nomad D° city D° destruction
'the nomads' destruction of the city' (Whitman 2001: 85, [14])

According to Whitman (2001), *no* is best analysed as realizing the functional category *Determiner* taking the NP complement to its right. As a consequence, the nominal projection in Japanese is mixed, displaying a head-final NP (adjective + noun) and a (recursive) head-initial DP. The pervasive (head-final) CCH postulated for Japanese thus does not exist to the extent assumed so far.

On the contrary; in addition to *no*, the projections headed by *ga* in the so-called *Major subject construction* are head-initial as well (cf. Whitman 2001, Paul and Whitman 2017). More precisely, the highest *ga* is a fusion of the heads Focus and Finite in the left periphery, while the second *ga* realizes T°:

(9) [$_{Foc/FinP}$ Sono kazi [$_{Foc/Fin'}$ ga [$_{TP}$ syoobootai [$_{T'}$ ga hayaku kita]]]].
that fire NOM fire-brigade NOM quickly came
'It is that fire that the fire brigade came quickly.' (Paul and Whitman 2017, §2.1.4, (25))

In fact, mixed head-directionality also holds for the nominal projection in Chinese. The so-called subordinator *de* turns out to be an instantiation of different head-*initial* functional heads on the nominal spine, among them light *n* and *Determiner* (cf. Paul 2017). Accordingly, only NP is head-*final* in Chinese,

---

[8] Commenting on feature 94a, Dryer (2008b) states: "Similarly included among suffixal adverbial subordinators […] are morphemes that are formally case suffixes", such as the instrumental *-inda* combining with gerunds to form 'because'-clauses in Kannada (Dravidian, India):

(i) Kannada (Sridhar 1990: 74); example 12 in Dryer (2008b)
Bisilu hecca:giruvudur -inda
heat much.ADV.be.N.PST.GERUND.OBL-INSTR
'since it's very hot' (http://wals.info/chapter/94; accessed on October 21, 2023)

[9] Cf. Gil (2013) in https://wals.info/chapter/60 (accessed on October 15, 2023): genitive and adjectives are incorrectly said to be "collapsed". In reality, Japanese should be in the "highly differentiated" category.

as evidenced by modification without *de* in (10a-b) (cf. Paul 2005, 2010); the projections headed by *de*, however, are head-*initial* and recursive:

(10) a. yī jiàn [$_{NP}$ zāng/ gānjìng yīfu][10]
1 CL dirty /clean dress
'a dirty/clean dress'

b. yī zhāng [$_{NP}$ mùtóu zhuōzi]
1 CL wood table
'a wooden table'

(11) a. yī jiàn [$_{DeP}$ [$_{AP}$ tèbié zāng/ gānjìng] [$_{De'}$ [$_{De°}$ de] [$_{NP}$ yīfu]]]
1 CL particularly dirty/ clean DE dress
'a particularly dirty/clean dress'

b. [$_{DP}$ [$_{TP}$ nǐ jìlái Øi] [$_{D'}$ [$_{D°}$ de] [$_{NP}$ xìni]]]
2SG send DE letter
' the letter you sent'

(12) [$_{DP}$ Zhāngsān [$_{D'}$ de [$_{nP}$ Lǐsì [$_{n'}$ de [$_{NP}$ zhàopiàn]]]]]
Zhangsan DE Lisi DE photograph
'Zhangsan's photograph(s) of Lisi' [not: 'Lisi's photograph(s) of Zhangsan']

(13) [$_{DP}$*shoubiao* [$_{DP}$*gege* [$_{DP}$*zhangfu* tā jiějie de yuánlái de zhàngfu] de gēgē] de shǒubiǎo]
3SG sister DE former DE husband DE brother DE watch
'the watch of [the brother of [his sister's former husband]]'

(14a-b) illustrate the rigid order between clausal complements of N and relative clauses (cf. Fu 1987: 167), reinterpreted here as the requirement for clausal complements to be merged in *n*P, not in higher DePs:

(14) a. Méi rén tīng [$_{DeP}$ [$_{rel.cl.}$ gāng tí] [$_{De'}$ de [$_{nP}$ [$_{compl.cl.}$ xiān chī fàn] [$_{n'}$ de jiànyì]]]]
NEG.have person listen just raise DE first eat food DE suggestion
'Nobody listens to the suggestion just made to eat first.' (cf. Fu 1987: 167)

b. *Méi rén tīng [$_{DP}$ [$_{compl.cl.}$ xiān chī fàn] [$_{De'}$ de [$_{rel.cl.}$ gāng tí] [$_{De'}$ de jiànyì]]]
NEG.have person listen first eat food DE just raise DE suggestion

Does this new analysis reduce the *dis*harmony between the head-initial VP and the nominal projection in Chinese, given that now only the lexical domain NP is head-final? Or is cross-categorial (dis)harmony measured between lexical categories only, to the exclusion of functional categories, given the crucial role of the concept of *verb patterner*? Evidently, grammatical models using a large array of functional categories must raise and answer these questions before adducing statistical tendencies from WALS as evidence, in order to know whether there exists a(ny) *tertium comparationis*. The preceding discussion where a few phenomena were examined in detail and compared to their treatment in WALS does not leave much room for optimism (cf. Paul 2015, ch. 8. for further discussion).

3.3. Wrap-up

Taking into account functional categories in addition to lexical categories often results in quite a different picture for head directionality and hence CCH, given that the CCGs were established by Greenberg (1963) as correlations holding between the verb and other, exclusively lexical, categories. The fact that WALS continues to gloss over grammatical items (such as the different heads on the D-spine, *'s, no,* and *de* in English, Japanese and Chinese discussed above) is detrimental and has far-reaching consequences, because WALS is increasingly referred to by formal syntactic theories working with FC, feature systems etc. such as the FOFC approach. However, the huge gap between the way data are interpreted and statistics for head

[10] The following abbreviations are used in glossing the Chinese examples: ATT attitude conveying C; CL classifier; CLOW low C; EXP experiential aspect; NEG negation; PERF perfective aspect; PL plural; SG singular.

directionality are obtained in WALS, on the one hand, and the universalist ambition of the FOFC, on the other, makes it strictly speaking impossible to adduce generalisations from WALS as crosslinguistic evidence for the FOFC (unless each data point is scrutinized and evaluated individually). That WALS is nevertheless cited as confirming the FOFC further weakens it and challenges its status as a "syntactic universal". At best, the FOFC is a statistical tendency in the form of a refined Head Parameter capturing a relativized kind of CCH. (Cf. Jing, Blasi, and Bickel 2022 for a probabilistic version of the FOFC).

In fact, any approach postulating as universal a principle based on head-directionality is doomed to failure. This also holds for the more "absolute" and according to Haider (2020) unacknowledged precursor of the FOFC, i.e. Haider's (2000) *Basic branching constraint*:

(15) *Basic branching constraint* (BBC):
"(Extended) projections are endocentric and rightbranching, that is, the phrasal nodes on the projection line are always on the right-hand side of the projection (i.e. following a sister node)" (Haider 2000: 48; Haider 2020: 17, (13)).

The BBC is more "absolute" than the FOFC because it exclusively allows for head-*initial* functional projections and rules out head-*final* functional projections (cf. (17)), irrespective of the directionality inside their complement. Like the FOFC, the BBC is based on CCGs in Greenberg (1963) and WALS and adduces *inter alia* the non-existence of 'VO C' as a robust universal (cf. Haider 2020: 1-2, (2c), (4)):

(16) *[[Subj. [T° [V° complement]]] C°]

(17) *[[complement $\text{head}_{L^\circ}]_{LP}$ $\text{head}_{F^\circ}]_{FP}$

(16) is precisely the structure attested in Chinese since the 5th c. BC (cf. Djamouri and Paul 2019).

4. The Chinese head-final split CP

Chinese sentence-final particles (SFPs) as C-heads in a three-layered split CP dominating a consistently head-initial TP directly challenge the FOFC. SFPs are full-fledged projecting and selecting functional heads with a complex feature make-up, on a par with Cs in Indo-European languages, for example. Like Cs in IE-languages, they have access to properties of TP (contra Cecchetto 2013). The split CP is attested since the 5th c. BC (cf. Djamouri and Paul 2019), against the backdrop of stable SVO order since the earliest documents from 13th c. BC. (cf. among others Chen 1956, Djamouri 1988, 2001; Paul 2015, ch. 2 and references therein).

(18) The split root CP (cf. Paul and Yan 2022: 183, based on Paul 2009, 2014, 2015, ch. 7)[11]
$[_{\text{Attitude-CP}}$ $[_{\text{Force-CP}}$ $[_{\text{LowCP}}$ $[_{\text{TP}}$ NP V NP] low C°] Force°] Attitude°]]]

C_1 (Low C)	C_2 (Force)	C_3 (Attitude)
le currently relevant state	*ba*Imp (advisative *ba*)	*a* softening *láizhe*$_3$ what did you just say?
láizhe$_1$ recent past	*ba*$_{Qconfirmation}$	*ei* gentle reminder
ne$_1$ continuing sit.	*ma*$_2$ yes/no question	*ou* impatience, surprise
		ma$_3$ dogmatic assertion
		zhene intensifier *ne*$_3$ exaggeration

(N.B. The semantic values indicated for each C-head can give a rough approximation only.) [12]

[11] For a more fine-grained picture, cf. Pan (2015, 2019); Paul and Pan (2017).

[12] Biberauer's (2017: 273) table 9.3, presented as summarizing the results of Paul (2014, 2015), is an arbitrary mixture of the tables in Paul (2014: 83; 2015: 284) with elements missing (e.g., *ne*$_1$) or added (*éryǐ* 'only' from Erlewine 2017), and where the semantic values of the C-heads are randomly (dis)respected (cf. e.g., Biberauer's incorrect characterization of the low C *láizhe*$_1$ as "prior knowledge").

This table recasts into modern terms the three rigidly ordered classes of SFPs identified by Zhu (1982: ch. 16), and like him uses indices to distinguish between homonymous heads. The *yes/no* question Force head *ma*$_2$ and the dogmatic assertion Attitude head *ma*$_3$, for example (where the speaker insists on her/his opinion), can be easily distinguished by the resulting interpretation and different intonational contours. There also exist homonyms within the same layer (here ForceP) such as the advisative *ba* (softening the imperative) and the confirmation seeking question *ba*, but they can be told apart by the associated semantics and sentence intonation (cf. Paul and Pan 2017 and references therein). Finally, the table in (18) foremost captures the relative hierarchy between SFPs, based on the same transitivity relation as used in cartography and already applied by Zhu (1982): if A precedes B and B precedes C, then A precedes C (in case B is not present). This is important because the co-occurrence of 'Low C + Force C + Attitude C' is rarely the case, given the selectional constraints holding for each SFP.

Based on the wealth of literature (mostly written in Chinese) on SFPs since Zhu (1982), this section provides a detailed analysis and demonstrates that Biberauer's (2017: 190) attempt to make Chinese SFPs "FOFC compliant" is doomed to failure. In particular, they do not "double" (semantic) information available within TP nor are they the syntactic equivalent of "extra-metrical" elements that do not "count" in structure-building. For reasons of space, I concentrate on Low Cs and the Force yes/no question head *ma*$_2$, because they prominently figure in Biberauer (2017).

4.1. Low CP

The low C-heads indicate whether the event in question holds at the speech time and/or whether it held before. With *ne*$_1$, the event still holds at speech time and likewise held in the past (19a). With *le*, the event holds at speech time and did not hold in the past (19b). With *láizhe*$_1$, the event held in the past and may or may not hold at speech time (with the latter as default case (19c)) (cf. among others Zhu 1982, Paul and Yan 2022 and references therein).

(19) a. [$_{\text{LowCP}}$ [$_{\text{TP}}$ Xià yǔ] ne] (Zhu 1982: 209)
fall rain CLOW
'It's (still) raining.' (Zhu's comment: It was raining before.)

b. [$_{\text{LowCP}}$ [$_{\text{TP}}$ Xià yǔ] le]
fall rain CLOW
'(Look), it's raining (now).' (Zhu's comment: It didn't rain before.)

c. [$_{\text{LowCP}}$ [$_{\text{TP}}$ Xià yǔ] láizhe]
fall rain CLOW
'It (just) rained.' (Zhu's comment: It rained a moment ago.)

The low Cs in (19a-c) are obligatory, because unlike statives, activity predicates must feature aspect markers, negation or auxiliaries for a non-habitual reading (cf. Kong 1994, Sun 2014). For *bare* activity predicates, a low C is required (cf. Paul 2018, Paul and Ramchand 2023).

The low C *le* has caused quite some confusion, due to its homonymy with the perfective aspect verb suffix *-le* . Although their distinctness was established a long time ago (cf. among others Chao 1968: 246, Teng 1973, Chan 1980, Li and Thompson 1981: 296, Zhu 1982), claims that both items instantiate one and the same category regularly make their reappearance in the literature. This seems particularly futile given the many cases provided in the literature where the aspectual suffix *-le* and the low C *le* co-occur (cf. Paul 2015: 276-277 for further discussion):

(20) a. Wǒ zài zhèr zhù -le wǔ nián le. (Zhu 1982: 209)
1SG at here live-PERF 5 year CLOW
'I have been living here for five years now.'

b. Wǒ zài zhèr zhù-le wǔ nián.
1SG at here live-PERF 5 year
'I lived here for five years.'

Given that the low C *le* relates the event to the speech time, (20a) with *le* unambiguously states that my living here obtains at speech time. By contrast, as pointed out by Zhu (1982: 209), (20b) without *le* implies my no longer living here. (For some speakers (20b) can be ambiguous and then also allows for the reading in (20a).)

When an explicit reference time (different from the speech time) is provided, *le* relates the event to that time:

(21) [$_{LowCP}$[$_{TopP}$[$_{TP}$ Wǒ yī ān mén-líng] [$_{Top'}$ [$_{TP}$ tā jiù lái kāi mén]]] le]
1SG once ring door-bell 3SG then come open door CLOW
'As soon as I rang the door bell, he came and opened the door.'
(slightly modified example from Chao 1968: 799)

Clearly, *le* and the other low Cs can*not* be analyzed as aspect markers (*pace* among others Lin 2015, Zhang 2019, Huang 2022).

Low Cs are sensitive to the properties of TP such as temporal adverbs and the verb's aktionsart and clearly have access to TP-internal material (*contra* Cecchetto 2013 who declares SFPs in Chinese as exempt from the FOFC, based on the alleged lack of any selectional relation):

(22) a. [$_{LowCP}$ [$_{TP}$ Tā zài xiūxi] le]
3SG PROGR rest CLOW
'He's having a rest (now).'

b. [$_{LowCP}$ [$_{TP}$ Tā *hái* zài xiūxi] ne /*le]
3SG still PROGR rest CLOW/ CLOW
'He's still having a rest.'

(23) [$_{LowCP}$ [$_{TP}$ Tā *gāngcái* hái zài bàngōngshì] láizhe/*le] (Paul and Pan 2017: 58, (24))
3SG just still be.at office CLOW / CLOW
'He was still in his office a moment ago [but has gone now].'

Relating the event to the speech time, *le* – unlike *ne* – is incompatible with the adverb *hái* 'still' indicating that the eventuality already held in the past. *Le* is likewise unacceptable in (23) where the adverb *gāngcái* 'a moment ago' exclusively locates the event in the past and where accordingly only *láizhe* is acceptable.

While *le* allows for all types of verbs within its TP complement, *ne$_1$* only allows for atelic verbs, to the exclusion of telic verbs (cf. (24)) and stative predicates, i.e. stative verbs and adjectives (cf. (25a-b)). *Láizhe*, like *ne,* excludes telic verbs (cf. (26a)), but is compatible with stative predicates (cf. (26b)).

(24) [$_{LowCP}$ [$_{TP}$ Xiǎo Wáng *cānguān/*líkāi* gōngchǎng] ne] (Yan 2018: 26, (11a-b))
Xiao Wang visit / leave factory CLOW
'Xiao Wang is visiting/leaving the factory.'

(25a) a. Tā fēicháng cōngmíng (*ne). (Paul and Yan 2022: (17a-b))
3SG very intelligent CLOW
'She is very bright.'

b. Tā hěn xǐhuān shùxué (*ne).
3SG very like mathematics CLOW
'She likes mathematics very much.'

(26) a. [$_{LowCP}$ [$_{TP}$ Xiǎo Wáng *cānguān/*líkāi* gōngchǎng] láizhe].
Xiao Wang visit / leave factory CLOW
'Xiao Wang visited/left the factory.'

b. [$_{LowCP}$ [$_{TP}$ Tā yǐqián {xǐhuān wǒ /hěn pàng}] láizhe]
3SG before like 1SG/ very fat CLOW
'She liked me/was overweight before.'

The approximate, "shorthand" characterization of *láizhe* as 'recent past' makes it very tempting to consider it as a tense marker. This is, however, not correct. First, in a sentence with *láizhe*, the presence of (past) temporal adverbs and aspect is strongly preferred:

(27) Tā {zuìjìn / shàng ge yuè} qù-guo gùgōng láizhe.
3SG recently/ last CL month go-EXP imperial.palace CLOW
'She went to the imperial palace recently/ a month ago.'

Second, "recent past" is a flexible notion (cf. Song 1981: 272) and depends on the speaker's judgement of the immediacy of the event (cf. 'last month' in (27)). Last, but not least, *láizhe* asserts that the event has taken place (cf. Song 1981: 275, Lü 2000: 348-349) and accordingly is incompatible with a TP whose predicate is negated:

(28) A: Nǐ shì bù shì qù kàn diànyǐng le?
2SG be NEG be go watch movie CLOW
'You went to the movies, didn't you?'
(Literally: 'Is it or is it not [the case] that you went to the movies?')

B: Wǒ zài jiā zuò zuòyè láizhe, méi qù kàn diànyǐng.
1SG at home do homework CLOW NEG go watch movie
'(In fact) I did my homework at home, I didn't go to the movies.'

(29) A: Nǐ shì bù shì zài jiā zuò zuòyè le?
2SG be NEG be at home do homework CLOW
'You did your homework at home, didn't you?'
(Literally: 'Is it or is it not [the case] that you did your homework at home?')

B: *Wǒ méi zài jiā zuò zuòyè láizhe. (Wǒ qù kàn -le diànyǐng.)
1SG NEG at home do homework CLOW 1SG go watch-PERF movie
'(In fact) I didn't do my homework at home. (I went to the movies.)'
(Paul and Yan 2022: 189; (24), (25))

In (28B), *láizhe* strengthens the assertion and corrects A's wrong assumption. In (29B), the first clause is unacceptable, due to the conflict between negation in TP and assertion strengthening conveyed by *láizhe*.

To summarize, the low Cs *láizhe*$_1$, *le* and *ne*$_1$ *qua* heads all impose selectional constraints on their complement. Material inside the TP complement must be compatible with the features of the low C; for example *láizhe* 'recent past' does not allow for future auxiliaries or adverbs in its TP complement. Furthermore, low Cs are associated with properties completely different from aspect, such as assertion strengthening for *láizhe*. Low Cs occupy a TP-*external* position in the right periphery (not at the edge of *v*P as in Erlewine 2017; cf. Pan 2018 for a critical review).

The TP-external position for SFPs is based on the robust generalisation in Huang (1982) (*Phrase Structure Condition*) that the extended verbal projection up to TP in Chinese is strictly head-initial and that the verb can only be followed by its (quasi) argument(s) (including NumberPs indicating duration or frequency and depending on the verb's aktionsart, cf. (30c)); adverbs and phrasal adjuncts (cf. (31a-b)) are totally excluded from the postverbal position in Mandarin (cf. Paul 2015, ch. 2 for discussion):

(30) a. Tā sòng-le [háizi] [hěn duō qián]
3SG give-PERF child very much money
'She gave the child a lot of money (as a present).'

b. Wǒ mài-le [yī liàng qìchē] [$_{PP}$ gěi tā]
1SG sell-PERF 1 CL car to 3SG
'I sold him a car.'

c. [$_{ClowP}$ [$_{TP}$ Tā yǐjīng lái -le wǔ cì] le]
3SG already come-PERF 5 time CLOW
'He has already come five times.'

(31) a. [TP Tā yě / měi tiān/ chángcháng lái]{* yě /*měi tiān/*chángcháng}
3sg also/ every day/ often come also/ every day/ often
'She also comes every day/often.'

b. [TP Tā {zài jiālǐ / báitiān} xiūxí] {*zài jiālǐ/ *báitiān}
3SG at home/ daytime rest at home/ daytime
'(At home/during daytime) he takes a rest (at home/during daytime).'

Accordingly, there is no position available for SFPs within TP (cf. (30c)), thus confirming their C-status.[13]

An analysis of the low Cs as overt realizations of T° (cf. Tang 1998: §2.4.2) is not plausible, either. The derivation of the linear order requires *ad hoc* assumptions that do not tie in with the overall syntax of Chinese: *inter alia*, the SFP must vacate T° and raise to C and remnant movement of TP to SpecCP is needed. (Cf. Tang 1998: 59 for additional necessary stipulations). More importantly, however, low Cs cannot be associated with a fixed tense value, as would be expected under Tang's (1998) scenario: the low C *le*, for example, occurs with present and past tense (cf. (19b, 22a) and (21) above).

To summarize, low Cs themselves do neither encode aspect nor tense (pace among others Lin 2015, Zhang 2019, Huang 2022). Importantly, low Cs do not "double" TP-internal information, as suggested by Biberauer (2017: 190).

Instead, Paul and Ramchand (2023) propose that low Cs are overt versions of the non-default anchor, the default anchor being the speech time t* (NOW), a moment. In the absence of aspect markers, which can either turn the event into a state (able to be true at a moment) or indicate a temporal precedence relation (as in the case of the perfective aspect -*le*), low Cs contribute to the finiteness (i.e. assertability in a root context) and are then obligatory (cf. (19a-c) above). This directly challenges "optionality" as a major ingredient in Biberauer's (2017) "FOFC compliant" analysis of the low CP presented below.

4.2. Biberauer's (2017) "FOFC compliant" analysis of the Chinese Low CP[14]

Since the early beginnings of the FOFC (cf. BHR 2008), the Chinese head-final CP dominating a strictly head-initial TP and extended *v*P has been a serious challenge. Biberauer's (2017) attempt to produce a FOFC-compliant analysis is as *ad hoc* as the preceding ones by BHR (among others BHR 2008, 2009, 2014) and in plain contradiction with all we know about Chinese syntax. Low Cs are declared to be "noninflecting auxiliaries" (cf. Biberauer 2017: 187, 196) thus escaping word order generalizations. Biberauer (2017: 200) invokes "Greenberg's original intuition regarding the "otherness" of uninflected auxiliaries": "[I]n establishing his universals, he *systematically excluded* "uninflected auxiliaries", given the fact that they so clearly do not pattern like inflected ones (see Greenberg 1963: 85, 93)" (Biberauer 2017: 187-188; emphasis mine).

While Greenberg (1963: 84-85) indeed exclusively considers auxiliaries inflected for *person* and *number* for ordering relations with the uninflected verb (cf. Universal 16),[15] he does *not* "systematically exclude" uninflected auxiliaries from his universals. He simply says: "Uninflected auxiliaries will be considered later in connection with verb inflections" (p. 85). However, nothing can be found about uninflected auxiliaries in the remainder of the article (nor in the appendices). Greenberg's (1963) page 93 mentioned in Biberauer's (2017: 187) quotation above only has one very remotely related passage: "Turning now to verb inflectional categories, we can state that since there are languages without inflection, there will obviously be languages in which the verb has no inflectional categories. In the far more frequent cases in which the verb has inflectional categories, a partial implicational hierarchy exists" (Greenberg 1963: 93). Accordingly, there is no way to know what languages and patterns Greenberg (1963) had in mind for uninflected auxiliaries.

[13] Thanks to reviewer 1 for urging me to address this issue.

[14] For Biberauer (2017: 291) the "FOFC is a "a deep" syntactic universal – a hierarchical universal, in Whitman's terms".

[15] Universal 16 (Greenberg 1963: 85): "In languages with dominant order VSO, an inflected auxiliary always precedes the main verb. In languages with dominant order SOV, an inflected auxiliary always follows the main verb."

Note, though, that English – like Chinese – has auxiliaries (*can, may, must, will*) that *are* uninflected for number and person. Given that in both (SVO) languages they precede their complement, they seem to behave like inflected auxiliaries in that they pattern with verbs and should therefore count for ordering generalizations and hence the FOFC. But instead of examining these uninflected auxiliaries in English and Chinese and illustrating their fundamental "otherness", Biberauer (2017: 188) turns to Dryer (1992: 99): "Similarly, Dryer (1992: 99) pinpointed the ability to "bear all or some of the verbal inflections associated with the clause" as a difference between his category "auxiliary verb" and "tense/aspect particle", concluding that the former should be regarded as heads ("verb patterners"), and the latter as modifiers ("object patterners")."

However, while Dryer (1992: 99) himself concedes that "It is not entirely obvious how tense/aspect particles should be treated in terms of head-dependent relation", he states that verb and tense/aspect particle do *not* form a correlation pair in his "Branching Direction Theory", hence tense/aspect particles are *no* "object patterners".[16] He considers this an additional argument against the "Head Dependent Theory" where tense/aspect particles are (incorrectly for Dryer) treated as modifiers of the verb, i.e. as object patterners. In fact, Dryer (1992: 99) explicitly excludes languages *lacking* verbal inflection, because it is not clear to him whether tense/aspect particles are verbs. Chinese clearly lacks inflection and is thus not intended to be covered by Dryer's (1992) generalization.

Be that as it may, let us turn to Biberauer's (2017: 187, (1a)) example of 'V O uninflected Aux' in Chinese, which – given the special status of uninflected auxiliaries – is said not to be subject to the FOFC:

(32) Ta chi-le fan le.[17]
3SG eat-PERF food PERF
'He has eaten.'

Strangely enough, the sentence-final alleged uninflected auxiliary *le* is glossed as PERF, i.e. on a par with the perfective aspect suffix *-le* following the verb *chī* 'eat'. Besides the lack of a convincing story whether and how these two alleged instances of PERF differ and how they are computed when co-occurring, the data provided above clearly contradict PERF status for the sentence-final low C *le*, such as low C *le's* compatibility with the progressive aspect *zài* in (22a) and *le*'s position in the sentence periphery above TP. Even if low Cs were uninflected Aux, they would need to merged at some point and be assigned a position in the sentence hierarchy, an issue left open by Biberauer (2017).

In fact, as pointed out by reviewer 1, if Chinese SFPs are denied head status and treated as "semantically related elements […] that do not count for FOFC purposes" (cf. Biberauer 2017: 189-190), they must either be adjuncts or specifiers. In the *Linear Correspondence Axiom* (LCA) based account adopted by BHR (2014), adjuncts and specifiers are indistinguishable and should linearize to the left. Accordingly, the roll-up movement necessary to derive the head-final order for SFPs cannot rely on the bottom-up percolation of the movement triggering feature ^. This, however, challenges BHR's (2014) analysis of the FOFC.

[16] "If the order of a pair of elements X and Y exhibits a correlation with the order of verb and object respectively, then I will refer to the ordered pair (X,Y) as a correlation pair, and I will call X a *verb patterner* and Y an *object patterner* […]" (Dryer 1992: 82).

[17] (32) is attributed to Paul (2014: 86); the associated footnote 16 in Paul (2014: 86) concerning the well-established difference between the perfective aspect suffix *-le* and the low C *le* is, however, omitted. The change of the gloss 'low C' for *le* to 'PERF' is addressed by Biberauer (2017) in endnote 1, p. 365: "Paul (2014) glosses clause-final *le* as Clow, reflecting her analysis of this element. The gloss given here instead prefigures the analysis to be presented in section 9.4.4.2, in terms of which this *le* and verbal *le* share certain meaning components, with clause-final *le* being a vP-internal element (see also Erlewine to appear a,b)." Note that Erlewine (to appear a), i.e. Erlewine (2017: 45-46), emphasizes the need to distinguish between the perfective suffix *-le* (glossed by him as PERF) and sentence-final *le* (glossed as LE and analyzed by him as a low C at the phase edge of the extended verbal projection). Accordingly, in all his examples, the low C "*le* is placed after a postverbal object to avoid this confound" (p. 45), a common strategy among specialists of Chinese syntax, because given Huang's (1982) *Phrase Structure Condition* (cf. section 4.1 above), *le* following the object cannot be mistaken for the aspectual verb suffix *-le*.

Clem (2022) likewise demonstrates that the data in Amahuaca can *not* be accommodated by a FOFC based on the LCA as in BHR (2014). In Amahuaca matrix clauses, the extended verbal projection is head-final, with the exception of the head-initial AspP and CP. CP is not dominated by any other head-final projection and thus obeys the FOFC. AspP, by contrast, is immediately dominated by the head-final TP which leads to a FOFC violation. [$_{TP}$ [$_{AspP}$ Asp° *v*P] T] (cf. Clem 2022: 816). This structure cannot have been generated by roll-up movement of T's complement, because the head-initial Asp° itself does not have any movement triggering feature ^ which could have been inherited by T°.

Crucially, the same holds for the Chinese head-final CP: since the extended verbal projection including T is head-initial, there simply is no roll-up movement triggering feature ^ for C to inherit. That is the reason why Biberauer (2017) declares them to be non-heads (via the alleged parallel with uninflected Aux), because otherwise these Cs would violate the FOFC.

Returning to Amahuaca, instead of discarding the FOFC altogether, Clem (2022: 819) opts for Cecchetto's (2013) and Zeijlstra's (2016) non-LCA based approaches that derive the FOFC from restrictions on rightward dependencies.

Cecchetto (2013) postulates that – unlike forward Agree – leftward Agree (at work in backward dependencies) cannot cross phrase boundaries. When a head-final head selects a head-initial *phrase* as complement, an exception from the FOFC is allowed. By contrast, when the respective *heads* are in a *direct* selectional relationship (creating a cross-phrasal inverted dependency), the FOFC holds and excludes such a structure. Zeijlstra (2016) derives the FOFC as a ban on rightward *movement* where dependents of the moving head must not be crossed. Accordingly, a final-over-initial structure is allowed by the FOFC provided no movement takes place.

Clem (2022: 820) concludes that both analyses allow for the base-generation of the final-over-initial structure in Amahuaca, which thus confirms the validity of the FOFC as a restriction on rightward dependency formation.

However, according to reviewer 1, both accounts are inherently problematic. Zeijlstra (2016) does not rule out *base-generation* of the very structures that served as the starting point for the FOFC and count as illicit such as 'V O Aux'. Accordingly, the head-final C over head-initial T in Chinese should be permissible as well, because there is no head movement of (covert) T-to-C (nor of overt Asp°-to-T-to-C), hence no illicit rightward dependency.

Cecchetto's (2013) proposal not only features a direction-specific stipulation for Agree, but also requires non-standard assumptions about selection and projection. In addition, his account of the Chinese CP is based on wrong premises. Low Cs immediately dominating TP and occupying a position corresponding to Rizzi's (1997) FinP are claimed not to exist, which allows him to state the lack of any Cs that "look inside the TP". However, as demonstrated above (section 4.1), low Cs are precisely sensitive to TP-internal material and show (in)compatibility with certain realizations of Asp° and Aux, thus illustrating the allegedly excluded cross-phrasal selectional relation between heads.

To summarize, the reformulation of the FOFC as a restriction on right dependencies still fails to remove the Chinese head-final CP as counter-evidence. In addition, this reformulation greatly reduces the empirical coverage of the FOFC, and is not entertained by Biberauer (2017) among her diverse attempts to come to terms with the Chinese CP, for the FOFC would then not be a universal, but merely a strong tendency.

4.3. ForceP

Both for reasons of space and because it has figured prominently in "FOFC-compliant" scenarios, this section only discusses the *yes/no* question Force head *ma*$_2$ among the heads in the second CP layer. (For a detailed analysis of the other Force heads, cf. Paul 2015, ch. 7; Pan and Paul 2016, Paul and Pan 2017; Paul and Yan 2022 and references therein).

Ma$_2$ was the first SFP to be analyzed as a complementizer (cf. Lee 1986, Tang 1989: 540), i.e., as a C-head taking a clausal complement (TP or Low CP):

(33) a. Tā huì shuō zhōngwén.
3SG can speak Chinese
'He can speak Chinese.'

b. [$_{CPforce}$ [$_{TP}$ Tā huì shuō zhōngwén] ma$_2$]?
3SG can speak Chinese FORCE
'Can he speak Chinese?'

The complement status of TP and the head status of *ma$_2$* are confirmed by its selectional restrictions: *ma$_2$* can only select a non-interrogative TP and is therefore incompatible with *wh*-questions (cf. (34a)) and TP-internal *yes/no* questions in the'A-*bù* 'not'-A' form (cf. (34b)). Being a Force head, *ma$_2$* must follow low Cs such as *le* and *ne$_1$* (cf. (35a-b)):

(34) a. [$_{TP}$ *Shéi* wèn-le tā] (*ma$_2$)?
who ask -PERF 3SG FORCE
'Who asked him?'

b. [$_{TP}$ Tā *dǒng bù dǒng* wèntí] (*ma$_2$)?
3SG understand NEG understand problem FORCE
'Does he understand the problem?'

(35) a. [$_{ForceP}$[$_{ClowP}$[$_{TP}$ Tā bù chōu yān] le] ma$_2$]?[18]
3SG NEG inhale cigarette CLOW FORCE
'Does he no longer smoke?'

b. [$_{ForceP}$[$_{ClowP}$[$_{TP}$ Tā hái méi zǒu] ne$_1$] ma$_2$] ?!
3SG still NEG leave CLOW FORCE
'Hasn't he left yet?!'

4.3.1. Ma$_2$ *as a "Q-particle" à la Biberauer (2017)*

Notwithstanding these well-known constraints for *ma$_2$* available in every reference grammar (cf. among others Li and Thompson 1981, ch. 18) and in the linguistic literature since Huang (1982), Biberauer (2017: 210) claims that *ma$_2$* is not a C-head, but a (not further described) "Q-particle" *exempt* from the FOFC: "As table 9.1 [position of polar question particle in relation to VO vs OV; WP] shows, V-O-Q is the most commonly attested pattern in the 312-language sample extracted from WALS, being significantly more common than the reverse disharmonic order. We seem, then, to have an empirical scenario within which V-O-C is never attested where C is a subordinating complementizer, but within which it is extremely common where C is a Q-particle. Given the robustness of the former gap (Dryer 2009b), more detailed consideration of the formal properties distinguishing complementizers and Q-particles seems warranted (*pace* Paul 2014, 2015, Pan and Paul 2017 [i.e. Paul and Pan 2017, WP])."

Biberauer (2017: 222) then states that "[…] final Q-particles do not appear to be *subordinators (i.e., complementizers)*. In many languages, this is clearly signaled by the presence of one or more initial

[18] In Biberauer's (2017: 272: (121a)) version (cf. citation below), the SFPs *le* and *ma* are glossed as PERF and Q, respectively, and the VP *chōu yān* 'inhale cigarette' is incorrectly presented as a single verb, with none of these far-reaching changes being mentioned nor motivated:

"(121a) Tā bù chōuyān le ma?
she/he NEG smoke PERF Q
'Does she/he no longer smoke?' (Paul 2015: 264)"

The misparsing of VP as V° is not trivial, for it undoes the intentionally chosen structure where sentence-final *le* is unambiguously the low C (cf. note 17 above).

complementizers, which surface in the expected initial position; in others, the interpretive contribution suggests a noncomplementizer element"[19] (emphasis mine).

Biberauer (2017: 261-262) further stipulates that Q-particles are acategorial; they lack the [+V] feature and are therefore exempt from the FOFC holding only for heads in the *same* extended projection; nor can they select or be selected. On p. 274, she seems to extend acategoriality to Chinese SFPs in general and suggests that each of the four phasal domains (V, *v*P, CP and SAP (Speech Act Phrase)) has its own periphery for hosting SFPs, in a way exempt from the FOFC. The SFPs in each phase are said to stem from different lexical arrays; their fixed relative order is obtained by the sequence in which they enter the derivation, without any appeal to selection. As noted by reviewer 1, this move seems to void the FOFC of any predictive power.

Finally, sentence-final Q-particles are declared to be "optional" (cf. Biberauer 2017: 230), based on BHR (2014): "In a survey of about 80 VO languages with final question particles, Bailey (2010, 2012) observed that these particles are very often optional *(this is true of Mandarin* ne *and* ma*, for example). Presumably this is possible because the question force is signaled by some other means, such as intonation*" (BHR 2014: 200-201; emphasis mine).

Extensive evidence is provided below invalidating these claims, concentrating on *ma*$_2$, given that there is no Force head *ne*$_2$ (*pace* Cheng 1991), but only the low C *ne*$_1$ and the Attitude *ne*$_3$.[20]

4.3.2. Ma$_2$ *as a full-fledged C-head*

It is well-known that Chinese *yes/no* questions can also be formed by a rising intonation alone (↑) as in (36b) (cf. among others Chao 1968: 41, 801; Lu 1985: 236):

(36) a. Tā zài Beǐjīng gōngzuò.
3SG at Beijing work
'He works in Beijing.'

b. Tā zài Beǐjīng gōngzuò ↑ ?
3SG at Beijing work
'Does he work in Beijing?'

[19] In the wake of Rizzi's (1997) split CP hypothesis for root clauses, the claim implicit in the citations above that "real" Cs must be of a subordinating kind no longer holds. Furthermore, Chinese also features some exclusively non-root Cs (cf. Paul 2014: §4.2; Paul 2015, ch. 7). While it is open for discussion whether "non-root C" equals "subordinating C", the non-root C *de* in the *propositional assertion* construction (cf. Paul and Whitman 2008) is a selected and selecting head: the projection headed by *de* is selected by the copula *shì* 'be', and *de* in turn selects a non-finite TP, requiring obligatory raising of the subject *wǒ* 'I' to the matrix TP:

(i) Wǒ shì [$_{CP[-root]}$ [$_{TP[-fin]}$ ~~wǒ~~ cóngláibù chōu yān] de]
1SG be 1SG ever NEG inhale smoke C[-root]
'(It is the case that) I have never smoked.' (Paul 2014: 99; (46))

[20] Cheng's (1991) alleged *wh*-question typing particle *ne* in fact realizes the Attitude head *ne*$_3$, soliciting the co-speaker's attention and rendered here by 'listen, and…' (cf. Pan and Paul 2016). This is well-documented (cf. among others Hu 1981: 418, Li and Thompson 1981: 305) and confirmed by the occurrence of *ne*$_3$ beyond *wh*-questions (i), i.e. in A-not-A questions (ii) and declaratives (iii). Like other Attitude heads, ne$_3$ is "optional", but is evidently required in order to signal the associated discourse function (cf. among others Pan 2011, Haegeman and Hill 2013):

(i) Nǐ jīntiān xiǎng qù nǎr ne ?
2SG today want go where ATT
'Listen, and you, where do you want to go today?'

(ii) Tā míngtiān néng bù néng lái ne?
3SG tomorrow can NEG can come ATT
'Listen, and he, can he come tomorrow?'

(iii) Bālí míngtiān yào xià xuě ne!
Paris tomorrow will fall snow ATT
'Imagine, it is going to snow in Paris tomorrow!'

However, in the majority of cases, the option of using intonation only to encode a *yes/no* question is excluded (cf. Pan and Paul 2016).

In "tag" questions with *bù shì ma*$_2$ 'NEG be FORCE' = 'isn't it [the case]?', the Force head *ma*$_2$ is obligatory and cannot be "replaced" by a rising intonation:

(37) Nǐ zài Beǐjīng gōngzuò, bú shì *(ma$_2$) ?
2SG at Beijing work NEG be FORCE
'You work in Beijing, don't you?'
(Lit.: 'You work in Beijing, isn't it so/isn't it the case?')

Similarly, in the presence of *wh*-indefinite construals 'something, someone', a *yes/no* question requires the presence of *ma*$_2$, because otherwise the sentence – due to the rising intonation – is analysed as a *wh* question (cf. Pan 2011: chapter 5):

(38) a. Nǐ xiǎng chī diǎn shénme ↑?
2SG want eat a.bit what
'What do you want to eat?'

b. Nǐ xiǎng chī diǎn shénme ma$_2$?
2SG want eat a.bit what FORCE
'Do you want to eat a little something?'

c. Ta pà shéi huì dǎ ta ↑?
3SG fear who will beat 3SG
'Who does he fear will beat him?'

d. Ta pà shéi huì dǎ ta ma$_2$?
3SG fear who will beat 3SG FORCE
'Is he afraid that someone will beat him?'

In this respect, Chinese is on a par with English, where a *yes/no* question can be either formed by subject-auxiliary inversion (SAI) or by rising intonation. Evidently, this does not imply that these two types are equivalent or that the existence of rising intonation renders SAI "optional" in the sense that it is not SAI that contributes the question interpretation. Quite on the contrary, Gunlogson (2001) provides extensive evidence to show that questions formed by rising intonation (her "rising declaratives": *It's raining*↑ ?) are clearly different from SAI questions (*Is it raining?*) and share properties with declarative sentences (her "falling declaratives"). Also note that negative polarity items and tag questions in English require SAI.

Ruan (2004: 23-25) and Wang and Ruan (2005:347) likewise demonstrate the differences in intonation for Chinese *yes/no* questions with and without *ma*$_2$. They examine the acoustic properties of three sentence types: (i) particle-less *yes/no* questions with rising intonation (39a); (ii) confirmation-seeking questions with the Force head *ba* (39b) and (iii) *yes/no* questions with the Force head ma$_2$ (39c):

(39) a. Zhàoqìng yào qù shòupiàochù ↑?
Zhaoqing will go ticket-booth
'Zhaoqing will go to the ticket-booth?'

b. Zhàoqìng yào qù shòupiàochù ba?
Zhaoqing will go ticket-booth FORCE
'Zhaoqing will go to the ticket-booth, I assume ?'

c. Zhàoqìng yào qù shòupiàochù ma$_2$?
Zhaoqing will go ticket-booth FORCE
'Will Zhaoqing go to the ticket-booth?'

For the 23 triplets investigated, they obtain a clear contrast between the particle-less questions and the *yes/no* questions with *ma*$_2$. Importantly, the nucleus pitch range in intonation questions is significantly wider than in *ma*$_2$-questions. Accordingly, from an acoustic point of view, a *ma*-question cannot be analysed as an intonation question with *ma* simply added on. This acoustic evidence combined with the different

syntactic constraints for intonation questions vs *ma₂* questions challenges BHR's (2014: 201) scenario for *ma₂*: "Conceivably, then, the languages in question have an abstract head in the left periphery encoding question force, triggering question intonation in the languages that have it, which is optionally doubled […] by a final overt particle."

This incorrect claim is resumed in Biberauer's (2017: 229-230) characterization of "final particles in the C-domain": "[….] they are often optional, thus not contributing centrally to the grammaticality of the structures they combine with, sometimes seemingly being 'secondary' to an initial element in the system."

"Optionality" as a crucial feature of *ma₂* is completely beyond the point, as it is for English SAI, both being used in question formation. *Ma₂* is a bona fide C encoding interrogative force, i.e. yes/no questions. It exclusively selects declarative TPs or low CPs and is in complementary distribution with other Force heads, such as the confirmation request *ba* (cf. (39b) above) and the advisative *ba*. ForceP in turn is selected by AttitudeP, as reflected in the rigid order 'TP < lowCP < ForceP < AttitudeP'.

4.3.3. Wrap-up

The preceding discussion has argued in favour of *ma₂* as a Force head, whose complement (TP or ClowP) is subject to selectional restrictions. This straightforwardly invalidates Li's (2006: 171) claim that the clause-typing heads always remain covert in Mandarin and Cantonese (whereas they may be realized overtly in Wenzhou). Given the semantically transparent and extremely well-documented Force heads *ma₂*, the confirmation request *ba* (cf. 39b) above) and the advisative *ba*, this is a very surprising statement. In particular, Li (2006: 64-65) does not see that there are two SFPs *ma,* the yes/no question Force head *ma₂* and the Attitude head *ma₃*, despite the well-established difference between the two (cf. among others Chao 1968: 801). Both del Gobbo, Munaro, and Poletto (2015) and Bailey (2015) adopt Li's (2006) incorrect claim that Chinese has no SFPs realizing Force such as imperative and interrogation. While Del Gobbo et al. (2015: 378) see this as a parallel with sentential particles in Romance, Bailey (2015: 420) considers it a general characteristic of final question particles in VO languages that they are in fact markers of "something other than interrogative force".

5. Conclusion

The FOFC is not a syntactic universal, but a relativized version of cross-categorial harmony (CCH), hence a statistical tendency.

While the FOFC is formulated as holding for heads within the same extended projection, each member of a correlation pair is taken in isolation for the cross-categorial generalizations (CCG) in Greenberg and WALS. Nevertheless, they are adduced as crosslinguistic evidence for the FOFC.

The detailed analysis of the Chinese head-final CP provided above demonstrates that its "FOFC-compliant" analysis by Biberauer (2017) is completely *ad hoc* and in contradiction with all we know about Chinese syntax. This raises doubts as to the validity of "FOFC-compliant" analyses by Biberauer (2017) for other languages featuring 'V O particle' structures and thereby challenging the FOFC.

In fact, CCH is much less pervasive than generally assumed. This becomes obvious when functional categories are taken into account, as illustrated by the "mixed" headedness of the nominal projection in Japanese and Chinese, with the lexical NP being head-final and the DP being head-initial. While the head-initiality of DP somewhat "reduces" the disharmony with VO for Chinese, it destroys the status of Japanese as *the* rigid subtype of SOV languages since Greenberg (1963). Furthermore, the category C in Chinese likewise shows mixed headedness, given that so-called "conjunctions" (e.g., *rúguǒ* 'if', *jíshǐ* 'even if', *jiùsuàn* 'even though', *jìrán* 'since', *suīrán* 'although', *yīnwèi* 'because' etc.) also realize C, but project head-initial CPs (cf. Pan and Paul 2018: 147).

In fine, more careful analyses taking into account functional categories (FC) instead of anachronistically remaining confined to the basically FC-less data in WALS might well lead to the result that so-called "mixed" systems are statistically predominant or at least as frequent as "harmonious" systems and contribute to further deconstruct CCH. Long live disharmony!

References

Bailey, Laura. 2015. Word order and the syntax of question particles. In *Final Particles*, edited by Sylvie Hancil, Alexander Haselow, and Margje Post, pp. 407–26. Berlin: De Gruyter. https://doi.org/10.1515/ 9783110375572-017.

Biberauer, Theresa. 2017. The Final-over-Final Condition and Particles. In *The Final-over-final Condition: A Syntactic Universal*, edited by Michelle Sheehan, Theresa Biberauer, Ian Roberts and Anders Holmberg, pp. 187–296. https://doi.org/10.7551/mitpress/8687.003.0012.

Biberauer, Theresa, Anders Holmberg, and Ian Roberts. 2008. Structure and linearization in disharmonic word orders. In *Proceedings of the 26th West Coast Conference on Formal Linguistics*, edited by Charles B. Chang and Hannah J. Haynie, pp. 96–104. Somerville, MA: Cascadilla Proceedings Project. http://www.lingref.com/cpp/wccfl/26/abstract1660.html

Biberauer, Theresa, Anders Holmberg and Ian Roberts. 2009. Linearization and the architecture of grammar: a view from the Final-over-final constraint. In *Proceedings of the XXXV Incontro di Grammatica Generativa*, *Studies in Linguistics* 3, edited by Vincenzo Mosati and Emilio Servidio, pp. : 77–89. Università degli Studii di Siena. Available at: ciscl.unisi.it/doc/doc_pub/STiL-2013-vol6-special_chesi.pdf.

Biberauer, Theresa, Anders Holmberg and Ian Roberts. 2014. A syntactic universal and its consequences. *Linguistic Inquiry* 45: 169–225. https://doi.org/10.1162/LING_a_00153.

Cecchetto, Carlo. 2013. Backward dependencies must be short: A unified account of the *Final-over-Final* and the *Right Roof* Constraints and its consequences for the syntax/morphology interface. In *Challenges to Linearization*, edited by Theresa Biberauer and Ian Roberts, pp. 57–92. Berlin: Mouton de Gruyter. https://doi.org/10.1515/9781614512431.57

Chan, Marjorie K.M. 1980. Temporal reference in Mandarin Chinese: An analytical-semantic approach to the study of the morphemes *le, zài, -zhe,* and *ne*. *Journal of the Chinese Language Teachers' Association* 15 3: 33–80.

Chao, Yuen Ren. 1968. *A Grammar of Spoken Chinese.* Berkeley: University of California Press.

Chen, Mengjia 1956. *Yinxu buci zongchu* [A general study of the Yin site oracle inscriptions]. Beijing: Kexue chubanshe.

Cheng, Lisa Lai-Shen. 1991. *On the Typology of Wh-questions*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA.

Clem, Emily. 2022. Disharmony and the Final-Over-Final Condition in Amahuaca. *Linguistic Inquiry* 53 4: 809–822. https://doi.org/10.1162/ling_a_00425.

Del Gobbo, Francesca, Nicola Munaro and Cecilia, Poletto. 2015. On sentential particles: A crosslinguistic study. In *Final Particles*, edited by Sylvie Hancil, Alexander Haselow and Margje Post, pp. 359–86. Berlin: De Gruyter. https://doi.org/10.1515/9783110375572-015.

Djamouri, Redouane. 1988, *Etude des formes syntaxiques dans les écrits oraculaires gravés sur os et écaille de tortue (Chine 14e – 11e siècle av. J.C.)*. Ph.D. thesis, Centre de recherches linguistiques sur l'Asie orientale, Ecole des Hautes Etudes en Sciences Sociales, Paris.

Djamouri, Redouane. 2001. Markers of predication in Shang bone inscriptions. In *Sinitic Grammar: Synchronic and Diachronic Perspectives*, edited by Hilary Chappell, pp. 143-171. Oxford: Oxford University Press.

Djamouri, Redouane, Waltraud Paul, and John Whitman 2013. Postpositions vs prepositions in Mandarin Chinese: The articulation of disharmony. In *Theoretical Approaches to Disharmonic Word Order*, edited by Theresa Biberauer and Michelle Sheehan, pp. 74–105. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199684359.003.0003. Available at: http://crlao.ehess.fr/index.php?177.

Djamouri, Redouane and Waltraud Paul. 2019. Disharmony in harmony with diachronic stability: The case of Chinese. In *The Determinants of Diachronic Stability*, edited by Anne Breitbarth, Melissa Farasyn,

Lieven Danckaert, and Miriam Bouzouita, pp. 101–130. Amsterdam: Benjamins. https://doi.org/10.1075/la.254.05dja. Available at: http://crlao.ehess.fr/index.php?177.

Dryer, Matthew S. 1992. The Greenbergian word order universals. *Language* 68 1: 81–138. https://doi.org/10.1353/lan.1992.0028

Dryer, Matthew S. 2008a. Position of polar question particles. *The World Atlas of Language Structures Online*, chapter 92, edited by Martin Haspelmath, Matthew S. Dryer, David Gil, and Bernard Comrie. Munich: Max Planck Digital Library. [Available online at http://wals.info/feature/92. Accessed on 24.02.2010]. https://doi.org/10.5281/zenodo.7385533

Dryer, Matthew S. 2008b. Order of adverbial subordinator and clause. *The World Atlas of Language Structures Online*, chapter 94, edited by Martin Haspelmath, Matthew S. Dryer, David Gil, and Bernard Comrie. Munich: Max Planck Digital Library. [Available online at http://wals.info/feature/94. Accessed on 24.02.2010]. https://doi.org/10.5281/zenodo.7385533

Dryer, Matthew S. and Martin Haspelmath (eds.). 2013. *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. Available at https://wals.info.

Emonds, Joseph. 1980. Word order in generative grammar. *Journal of Linguistic Research* 1: 33–54.

Erlewine, Michael Yoshitaka. 2017. Low sentence-final particles in Mandarin Chinese and the Final-over-Final Constraint. *Journal of East Asian Linguistics* 26 1: 37-75. https://doi.org/10.1007/s10831-016-9150-9.

Fu, Jingqi. 1987. *La structure du syntagme nominal en chinois.* Ph.D. thesis, University Paris 3.

Gil, David. 2013. Genitives, adjectives, and relative clauses. *The World Atlas of Language Structures Online*, Chapter 60, edited by Matthew Dryer and Martin Haspelmath (v2020.3). Zenodo. https://doi.org/10.5281/zenodo.7385533

Greenberg, Joseph H. 1963. Some universals of grammar with particular reference to the order of meaningful elements. In *Universals of Language: Report of a Conference Held at Dobbs Ferry, New York, April 13-15, 1961*, edited by Joseph H. Greenberg, pp. 73–113. Cambridge, MA: MIT Press.

Grohmann, Kleanthes K. and Evelina Leivada. 2020. Reconciling linguistic theories on comparative variation with an evolutionarily plausible language faculty. In *Syntactic Architecture and its Consequences: Synchronic and Diachronic Perspectives, volume 2*: *Syntax Inside the Grammar*, edited by András Bárány, Theresa Biberauer, Jamie Douglas, and Sten Vikner, pp. 561–578. Berlin: Language Science Press. https://doi.org/10.5281/zenodo.4280629.

Gunlogson, Christine. 2001. *True to Form: Rising and Falling Declaratives as Questions in English*. Ph.D. thesis, University of California Santa Cruz.

Haegeman, Liliane and Hill, Virginia. 2013. The syntacticization of discourse. In *Syntax and its Limits*, edited by Raffaella Folli, Christina Sevdali, and Robert Truswell, pp. 370–390. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199683239.003.0018

Haider, Hubert. 2000. OV is more basic than VO. In *The Derivation of VO and OV*, edited by Peter Svenonius, pp. 45–67. Amsterdam: Benjamins. https://doi.org/10.1075/la.31.03hai

Haider, Hubert; 2020. *Final-over-Final – *Initial-over-Final: The universal asymmetry of functional projections. Ms, Dept. of Linguistics and Centre for Cognitive Neuroscience, University of Salzburg. Available at: https://ling.auf.net/lingbuzz/005598.

Hu, Mingyang. 1981. Běijīnghuà de yǔqì zhǔcí hé tàncí [Mood particles and interjections in the Beijing dialect]. *Zhongguo Yuwen* 5: 347–350; 6: 416–423.

Huang, C.-T. James. 1982. *Logical Relations in Chinese and the Theory of Grammar*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA.

Huang, C.-T. James. 2022. Finiteness, opacity, and Chinese clausal architecture. In *New Explorations in Chinese Theoretical Syntax: Studies in Honor of Yen-Hui Audrey Li*, edited by Andrew Simpson, pp. 17–76. Amsterdam: Benjamins. https://doi.org/10.1075/la.272.02hua.

Jing, Yingqi, Damián E. Blasi, and Balthasar Bickel. 2022. Dependency-length minimization and its limits: A possible role for a probabilistic version of the final-over-final condition. *Language* 98 3: 397–418. https://doi.org/10.1353/lan.0.0267.

Kong, Lingda. 1994. Yǐngxiǎng hànyǔ jùzi zìzú de yǔyán xíngshì [Linguistic forms that affect sentence completeness in Chinese]. *Zhongguo Yuwen* 6: 434–440.
Leivada, Evelina. 2020. Mid-level generalizations of generative linguistics: Experimental robustness, cognitive underpinnings and the interdisciplinarity paradox. *Zeitschrift für Sprachwissenschaft* 39 3: 357–374. https://doi.org/10.1515/zfs-2020-2021.
Lee, Thomas Hun-tak. 1986. *Studies on Quantification in Chinese.* Ph.D. thesis, University of California Los Angeles.
Li, Boya. 2006. *Chinese Final Particles and the Syntax of the Periphery*. Ph.D. thesis, University of Leiden.
Li, Charles N. and Thompson, Sandra A. 1981. *Mandarin Chinese: A Functional Reference Grammar*. Berkeley: University of California Press.
Lin, Tzong-hong Jonah. 2015. Tense in Mandarin Chinese sentences. *Syntax* 18: 320–342. https://doi.org/ 10.1111/synt.12032
Lu, Jianming. 1985. Guānyú xiàndài hànyǔ lǐ de yíwèn yǔqìcí [On question particles in contemporary Chinese]. *Yufa yanjiu he tansuo* 3: 233–246.
Lü, Shuxiang (ed.). 2000. *Xiàndài hànyǔ bābǎi cí* [800 words of Modern Mandarin]. Beijing: Shangwu.
McCloskey, Jim. 1991. Clause structure, ellipsis, and proper government in Irish. *Lingua* 85: 259–302. https://doi.org/10.1016/0024-3841(91)90023-X.
Munaro, Nicola and Jean-Yves Pollock. 2005. Qu'est-ce que *(qu)-est-ce que*? A case study in comparative Romance interrogative syntax. In *The Oxford Handbook of Comparative Syntax*, edited by Guglielmo Cinque and Richard Kayne, pp. 542–606. Oxford: Oxford University Press.
Newmeyer, Frederick J. 2005. *Possible and Probable Languages*. *A Generative Perspective on Linguistic Typology.* Oxford: Oxford University Press.
Pan, Victor Junnan. 2011. *Interrogatives et quantification en chinois mandarin: une approache générative.* Rennes: Presses universitaires de Rennes.
Pan, Victor Junnan. 2015. Mandarin peripheral construals at syntax-discourse interface. *The Linguistic Review* 32 4: 819–868. https://doi.org/10.1515/tlr-2015-0005
Pan, Victor Junnan. 2018. Derivation of the apparent narrow scope of sentence-final particles in Chinese: a reply to Erlewine (2017). *Studies in Chinese Linguistics* 39 2: 99–126. https://doi.org/10.2478/scl-2018-0004.
Pan, Victor Junnan. 2019. *Architecture of the Periphery in Chinese: Cartography and Minimalism*. London: Routledge. https://doi.org/10.4324/9781315158228.
Pan, Victor Junnan and Waltraud Paul. 2016. Why Chinese SFPs are neither optional nor disjunctors. *Lingua* 170: 23–34. https://doi.org/10.1016/j.lingua.2015.10.005. Available at: http://crlao.ehess.fr/index.php?177.
Pan, Victor Junnan and Waltraud Paul. 2018. The syntax of complex sentences in Mandarin Chinese: A comprehensive overview with analyses. *Linguistic Analysis* 42 1-2: 63–161. https://www.linguisticanalysis.com/volumes-volume-42-issue-1-2/. Available at: http://crlao.ehess.fr/index.php?177.
Paul, Waltraud. 2005. Adjectival modification and related issues in Mandarin Chinese. *Linguistics* 43: 757–793. https://doi.org/10.1515/ling.2005.43.4.757. Available at: http://crlao.ehess.fr/index.php?177.
Paul, Waltraud. 2009. Consistent disharmony: Sentence-final particles in Chinese. Unpublished ms., Paris. Available at: http://crlao.ehess.fr/index.php?177.
Paul, Waltraud. 2010. Adjectives in Mandarin Chinese: The rehabilitation of a much ostracized category. In *Adjectives: Formal Analyses in Syntax and Semantics*, edited by Patricia Cabredo-Hofherr and Ora Matushansky, pp. 115–152. Amsterdam: Benjamins. https://doi.org/10.1075/la.153.04pau. Available at: http://crlao.ehess.fr/index.php?177.
Paul, Waltraud. 2014. Why particles are not particular: Sentence-final particles in Chinese as heads of a split CP. *Studia Linguistica* 68 1, Special issue on the syntax of particles, edited by Theresa Biberauer, Liliane Haegeman, and Ans van Kemenade, pp. 77–115. https://doi.org/10.1111/stul.12020. Available at: http://crlao.ehess.fr/index.php?177.

Paul, Waltraud. 2015. *New Perspectives on Chinese Syntax*. Berlin: De Gruyter. https://doi.org/10.1515/ 9783110338775. Available at: http://crlao.ehess.fr/index.php?177.

Paul, Waltraud. 2017. The insubordinate subordinator *de* in Mandarin Chinese: Second take. In *The Attributive Particle in Chinese* [Frontiers in Chinese Linguistics Series], edited by Sze-Wing Tang, pp. 3–30. Beijing: Beijing University Press. Available at: http://crlao.ehess.fr/index.php?177.

Paul, Waltraud. 2018. The encoding of finiteness in Chinese. Paper presented at the *10th Conference of the European Association of Chinese Linguistics*, Università degli Studi di Milano and U. degli Studi di Milano-Bicocca, Milan, 28-29 September 2018. Available at: http://crlao.ehess.fr/index.php?177.

Paul, Waltraud and Victor Junnan Pan 2017. What you see is what you get: Chinese sentence-final particles as head-final complementizers. In *Discourse Particles: Formal Approaches to their Syntax and Semantics*, edited by Josef Bayer and Volker Struckmeier, pp. 49–77. Berlin: De Gruyter. https://doi.org/ 10.1515/9783110497151-003. Available at: http://crlao.ehess.fr/index.php?177.

Paul, Waltraud and Gillian Ramchand. 2023. Anchoring and stativity in English and Mandarin Chinese. Talk presented at the 13th Workshop on Theoretical East Asian Linguistics, National Taiwan Normal University, Taipei, May 12-14, 2023. Available at: https://drive.google.com/file/d/1IIll00-oj9B0x-lCPw5SjV08yJGxrt1K/view

Paul, Waltraud and John Whitman; 2017. Topic prominence. In *The Blackwell Companion to Syntax*, 2nd edition, Volume VII, chapter 117, edited by Martin Everaert and Henk van Riemsdijk, pp. 4473-4503. Oxford: Blackwell https://doi.org/10.1002/9781118358733.wbsyncom065. Available at: http://crlao.ehess.fr/index.php?177.

Paul, Waltraud and Shanshan Yan. 2022. Sentence-final particles in Mandarin Chinese: Syntax, semantics and acquisition. In *Discourse Particles: Syntactic, Semantic, Pragmatic and Historical Aspects*, edited by Xabier Artiagoitia, Arantzazu Elordieta, and Sergio Monforte, pp. 179–206. Amsterdam: Benjamins. https://doi.org/10.1075/la.276.07pau. Available at: http://crlao.ehess.fr/index.php?177.

Ruan, Lüna 2004. Hanyu Yiwenju Yudiao Yanjiu [Research on the intonation of interrogative sentences in Chinese]. MA thesis, Beijing Language and Culture University, Beijing.

Sheehan, Michelle, Theresa Biberauer, Ian Roberts, and Anders Holmberg. 2017. *The Final-over-Final Condition. A Syntactic Universal.* MIT Press. https://doi.org/10.7551/mitpress/8687.001.0001.

Song, Yuzhu. 1981. Guānyú shíjiān zhùcí *de* hé *láizhe* [On the tense particles *de* and *láizhe*]. *Zhongguo Yuwen* 1981, nr. 4: 271–276.

Sun, Hongyuan. 2014. *Temporal Construals of Bare Predicates in Mandarin Chinese.* Ph.D. thesis, Leiden University. Available at: https://openaccess.leidenuniv.nl/handle/1887/29991.

Tang, Sze-Wing. 1998. *Parametrization of Features in Syntax*. Ph.D. thesis, University of California at Irvine.

Tang, Ting-chi. 1989. *Hànyǔ cífǎ jùfǎ xùjí* [Studies on Chinese Morphology and Syntax], vol. 2. Taipei: Student Book Co.

Teng, Shou-hsin. 1973. Negation and aspects in Chinese. *Journal of Chinese Linguistics* 1 1: 191–214.

Wang, Yunjia and Lüna Ruan. 2005. Putonghua yiwenju yudiao de shiyan yanjiu [Experimental research on the intonation of interrogative sentences in Mandarin]. *Proceedings of the National Conference on Man-Machine Speech Communication*, pp. 344–349. Chinese Academy of Sciences, Beijing.

Whitman, John. 2001. Kayne 1994: P. 143, Fn. 3. In *The Minimalist Parameter. Selected papers from the Open Linguistics Forum, Ottawa, 21-23 March 1997*, edited by Galina M. Alexandrova and Olga Arnaudova, pp. 77–100. Amsterdam: Benjamins. https://doi.org/10.1075/cilt.192.07whi.

Whitman, John. 2008.The classification of constituent order generalizations and diachronic explanation. In *Linguistic Universals and Language Change*, edited by Jeff Good, pp. 233–252. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199298495.003.0010.

Whitman, John and Yohei Ono. 2017. Diachronic interpretations of word order parameter cohesion. In *Micro-change and Macro-change in Diachronic Syntax*, edited by Eric Mathieu and Robert Truswell, pp. 43–60. Oxford: Oxford University Press. https://doi.org/10.1093/oso/9780198747840.003.0004

Yan, Shanshan. 2018. *Chinese Sentence-final Particles and their Behaviours in English Speakers' L2 Chinese*. Ph.D. thesis, University of Cambridge. Available at: https://www.repository.cam.ac.uk/handle/1810/275336.

Zhang, Niina Ning. 2019. Sentence-final aspect particles as finite markers in Mandarin Chinese. *Linguistics* 57 5: 967–1023. https://doi.org/10.1515/ling-2019-0020

Zhu, Dexi. 1982. *Yǔfǎ jiǎngyì* [On grammar]. Beijing: Shangwu Press.