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極性疑問小辞とFinal-Over-Final Constraint

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Polar Question Particles and the Final-Over-Final Constraint*

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Sentence-final polar question particles in VO languages (VOQ) seem to be counterexamples to the Final-Over-Final Constraint (FOFC) (Holmberg 2000, Biberauer *et al*. 2008). By comparison with adverbial subordinators, it is argued that in PF question particles can move from the sentence-initial position to the sentence-final position without violating the syntactic constraint FOFC. This PF-movement analysis is supported by the following facts: (i) question particles can occur in various positions in the sentence, just as clitics do in a number of languages; (ii) sentence-final question particles are phonologically lighter than sentence-initial question particles; (iii) most VOQ languages are tonal languages with the light tone on question particles.

1. Introduction

The Final-Over-Final Constraint (FOFC), proposed by Holmberg (2000) and Biberauer *et al*. (2008), explains word order typology data quite nicely. For example, it correctly predicts that there is no language with V-O-Aux order. However, polar question particles (Q) are a problem for FOFC because in more than half of VO languages they appear in the sentence-final position, thus violating FOFC. We need to explain why VOQ languages violating FOFC outnumber VO languages with the harmonic word

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order QVO.

In this paper, we argue that question particles may violate FOFC because some particles, which are not long or heavy enough to make a prosodic word by themselves, must cliticize to the preceding word. It is not possible for a sentence-initial particle to cliticize to the following word because it is separated from the following IP by long juncture. The juncture between Q and its sister IP is longer in [Q IP] than in [IP Q], as we argue below. Then, a sentence-initial particle should stand alone as a prosodic word, which is possible only if the particle is long or heavy enough. We show evidence for junctural asymmetry between right-branching structure and left-branching structure.

In Section 2, we illustrate how sentence-final question particles in VO languages are potential counterexamples to FOFC. Section 3 shows that the sentence-initial element is more separated from the rest of the sentence than the sentence-final element. In Section 4, we argue that question particles may move from the sentence-initial position to another position in the sentence in PF. Section 5 concludes the discussion.

2. The Final-Over-Final Constraint and the Position of Question Particles

2.1 Question Particles violating the Final-Over-Final Constraint

Holmberg (2000) and Biberauer *et al*. (2008) propose the Final-Over-Final constraint (FOFC) on word orders in languages. It is formulated as in (1).

(1) If a phrase α is head-initial, then the phrase β immediately dominating α is head-initial. If α is head-final, β can be head-final or head-initial.

FOFC rules out the structure in (2).

(2) *[$_{\beta P}$ [$_{\alpha P}$ α γP] β]

We assume the universal base hypothesis proposed by Kayne (1994). Then, the base structure of (2) is (3) with the order Specifier-Head-Complement, which is linearized as in head-initial languages such as English.

(3) [$_{\beta P}$ β [$_{\alpha P}$ α γP]]

In (3), a head β is in the initial position of βP immediately dominating αP which is also head-initial (initial-over-initial). The complement of α, γP, may move to the specifier position of α in languages with a disharmonic word-order as shown in (4).

(4) [$_{\beta P}$ β [$_{\alpha P}$ γP α]]

This structure, initial-over-final, may be changed into the final-over-final structure by moving αP to the Spec of β as shown in (5).

(5) [$_{\beta P}$ [$_{\alpha P}$ γP α] β]

This is the structure of head-final languages such as Japanese. The word orders in (3), (4) and (5) are often found in the world's languages. Biberauer *et al*. (2008) argue that the word order in (2) is rare because it violates FOFC. They show that this is the case with the order of Aux, V and O in Germanic and other languages, which do not have V-O-Aux order (*[$_{IP}$ [$_{VP}$ V O] Aux].

However, as Biberauer *et al*. (2008) point out, VO languages may have clause-final question particles. For example, consider the following sentence from Mandarin Chinese (Li and Thompson 1981: 547):

(6) *nǐ* *néng* *xiě* *Zhōngguó* *zì* *ma*
you can write Chinese character Q
'Can you write Chinese characters?'

Let us assume that a question particle occurs in the head position of CP taking IP as its complement. Then this example has the structure $[_{CP}\ [_{IP}\ \ldots\ I\ [_{VP}\ VO]]\ Q]$, which violates FOFC because Q is the final head immediately dominating the IP with the initial head I.

Note here that it is logically possible for VO languages with clause-final Q particles to have a final-head I in IP, as in $[_{CP}\ [_{IP}\ \ldots\ [_{VP}\ VO]\ I]\ Q]$. However, this structure also violates FOFC because I is the final head immediately dominating the VP with the initial head V. Biberauer *et al*. (2008) argue that this type of IP structure $[_{IP}\ \ldots\ [_{VP}\ VO]\ I]$ is not found in the languages of the world.

Thus, a language violates FOFC if it has the VO order and clause-final Q particles (VOQ), irrespective of the order of I and VP. An examination of the data in Haspelmath *et al*. (2009) (*The world atlas of language structures online,* henceforth *WALS*) shows that out of 246 VO languages with Q particles, 135 languages have clause-final Q particles (VOQ) violating FOFC.[1] Languages of this type outnumber the 75 languages with the VO order and clause-initial Q particles (Q ... VO), which are consistently head-initial and observing FOFC.[2]

The fact that question particles occur at the clause-final position in more than half of VO languages with question particles becomes more striking when we consider adverbial subordinators such as *before* and *when*, which also occur in the C position. According to *WALS*, out of 315 VO languages, only 2 languages (Buduma (Afro-

[1] This is the result of combining two features: "83 Order of object and verb" and "92 Position of polar question particles" at http://wals.info/feature, accessed on Feb. 25, 2009.
[2] In VO languages, question particles also occur at the second position in 18 languages, at other positions in 6 languages and in either of two positions in 12 languages. We will return to this point in Section 4.2.

Asiatic, Nigeria) and Guajajara (Tupian, Brazil)) have clause-final subordinator words. These languages have the structure [$_{CP}$ [$_{IP}$ ... I [$_{VP}$ VO]] Sb], and thus seem to be counterexamples to FOFC. However, Newton (2007) argues that Buduma and Guajajara are not real counterexamples to FOFC because they have the OV order in subordinate clauses.[3] Thus, we can conclude that adverbial subordinators do not violate FOFC.[4]

2.2 Previous approaches to the clause-final question particles in VO languages

Thus the question arises: why are question particles different from adverbial subordinators in occurring at the clause-final position in VO languages violating FOFC? If we assume that both of them occur in the head C position in CP, the difference cannot be in their syntactic positions. Biberauer *et al*. (2008) suggest two possible approaches to the problem. The first is to revise the definition of FOFC to make it category-sensitive, as shown in (7).

(7) If a phase head PH has an EPP feature, then all the heads in its complement domain from which it is non-distinct in categorial features must have an EPP feature.

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[3] In any case, these adverbial subordinators are light enough to be moved from the clause-initial position to the end of clause in PF, escaping FOFC, as we argue below.

(i) a. Buduma (Lukas and Nachtigal 1939: 80)
Uli dúlima mána hábahan nahaŋge ga nāle
Boy leprous word friend heard.3sg Prt went.3sg
'When the leprous boy heard his friend's word he went'

b. Guajajara (Bendor-Samuel 1972: 168)
Kaitan ze pa kamiaw uzuka aʔe pa
Kaitan say Prt lorry killed it Prt
'They say that a lorry killed Kaitan.'

[4] *WALS* also shows languages with 'more than one type of adverbial subordinators with none dominant', which contain VO languages with clause-final adverbial subordinators such as Majang (Nilo-Saharan, Ethiopia) and Bwe Karen (Sino-Tibetan, Myanmar). We will discuss these languages in Section 3.2.

In the case of [$_{CP}$ [$_{VP}$ VO] Q], the lower head V can be distinct from the dominating head Q if the categorial feature of Q is nominal. However, it is not straightforward to argue that all the question particles violating FOFC are nominal because question particles have different origins, such as negative marker (Aldridge 2008), conjunction and others (Paul 2008). Moreover, adverbial subordinators as well as question particles can be nominal. For example, *while* is originally a noun, and *because* includes a noun *cause* in English. Then, we cannot distinguish question particles from adverbial subordinators, which observe FOFC.

Another possibility Biberauer *et al*. (2008) suggest is to assume that question particles are non-phase heads or defective phase heads, which also include circumpositions, "deficient" auxiliaries, aspect markers and negation elements. Then, we can explain why question particles do not conform to FOFC, which is supposed to apply to phase heads such as *v* and C. However, Biberauer *et al*. (2008) do not show any specific arguments for this analysis.

Thus, it is worth trying another approach to question particles that apparently violate FOFC. In the following sections, we argue that clause-initial question particles may move rightwards in PF without violating the syntactic constraint FOFC. In the next section, we show that juncture between constituents is longer in right-branching structure than in left-branching structure. We argue that this junctural asymmetry is reflected in the differences between clause-initial Cs and clause-final Cs. In Section 4, we propose an analysis in terms of Q-movement in PF, thus explaining why VOQ order is allowed in a number of languages. We show that this analysis has good consequences in the landing sites of Q-Movement and the geographical overlap between VOQ languages and tonal languages.

3. Morpho-Phonology of Sentence-Initial/Final Question Particles

3.1 Short/long juncture in left/right-branching structure

In this section, we argue that question particles in sentence-initial positions are different morpho-phonologically from sentence-final ones. Before discussing question particles, let us consider the difference between sentence-initial position and sentence-final position. In Tokizaki (2008), it is argued that juncture between constituents is shorter in left-branching structure than in right-branching structure. To illustrate this, the juncture between A and B in (8a) is shorter than that in (8b).

(8) a. $[_{\beta}\ [_{\alpha}$ ... A] B]
b. $[_{\beta}$ B $[_{\alpha}$ A ...]]

Below are three kinds of data demonstrating this junctural asymmetry. First, Japanese sequential voicing (*Rendaku*) and Korean *n*-insertion occurs in left-branching structure (9a) and (10a) but not in right-branching structure (9b) and (10b) (cf. Otsu (1980), Han (1994)).

(9) a. [[*nise danuki*] *shiru*] → *jiru*
mock badger soup
'mock-badger soup'
b. [*nise* [*tanuki shiru*]] → * *danuki*
mock badger soup
'mock badger-soup'

(10) a. [[*on chən*] *yok*] → *nyok*
hot spring bathe
'bathing in a hot spring'
b. [*kyəŋ* [*yaŋ sik*]] → * *nyaŋ*
light Western food
'a light Western meal'

Second, Krott *et al*. (2004) show that in Dutch, the occurrence of interfixes including *-s-* in tri-constituent compounds matches the major constituent boundary better in right-branching compounds than in left-branching compounds. (11) shows examples with unmarked interfixes occurring at the constituent boundary, and (12) shows those with marked interfixes occurring in a constituent. The numbers of examples with *-s-* and all interfixes Krott *et al.* (2004) found in their data are shown in the parentheses.

(11) a. [[*grond wet*]-*s*-*aartikel*] (*-s-* 25; all 39)
ground-law-IF-article
b. [*arbeid-s*-[*vraag stuk*]] (*-s-* 38; all 60)
employment-IF-question issue

(12) a. [[*scheep-s-bouw*] *maatschappij*] (*-s-* 13; all 50)
ship-building company
b. [*hoofd* [*verkeer-s-weg*]] (*-s-* 3; all 11)
main traffic-IF-road

The ratio of the unmarked interfix position (11) to the marked interfix positon (12) is higher in right-branching structure ((11b)/(12b): *-s-* 38/3=12.7/1; all 60/11=5.5/1) than in left-branching ((11a)/(12a): *-s-* 25/13=1.9/1; all 39/50=0.8/1). This shows that interfixes are more likely to occur at a constituent boundary in right-branching structure than in left-branching structure.

Third, Hyman (2008: 323) argues that suffixes tend to be more tightly bound to their root than prefixes. Similarly, Julien (2002: 226) points out that a suffix bears a close structural relation to the root that it attaches to, while the structural relation between a prefix and the root it attaches to is less stable. These observations also support the asymmetry in juncture because [prefix [$_{\text{Root}}$ ...]] is right-branching while [[$_{\text{Root}}$ ...] suffix] is left-branching.

These cross-linguistic facts show that juncture between constituents is longer in right-branching structure than in left-branching structure. In the next section, we argue that this junctural asymmetry causes the differences between clause-initial Cs and clause-final Cs.

3.2 Asymmetry between sentence-initial and sentence-final Cs

Junctural asymmetry is demonstrated when elements, including polar question particles and adverbial subordinators, occur at the complementizer position (C). Before we consider polar question particles, let us look at adverbial subordinators. According to Dryer (2005b: 383), there are languages with both affixes and separate words functioning as adverbial subordinators. He points out that in Majang (Nilo-Saharan, Ethiopia), adverbial clauses tend to involve a word at the beginning of the clause and a clitic at the end (Unseth 1989: 117).[5]

(13) *agutucee-ko tolay ɗoko-ɗu ogol-ku*
because-PST Tolay bring-reason mead-reason
'because Tolay brought mead'

This example further illustrates that a head taking a clause as its complement will appear as a separate word in the clause-initial position while it can be a suffix in the clause-final position.[6]

The asymmetry between sentence-initial position and sentence-final position is also

[5] There is also a suffix on the verb that encodes the meaning 'because' in (13).
[6] Taiwanese *kong* can appear at the clause-final position as well as the clause-initial position (Simpson and Wu (2002a, b)). Bengali (Indic, Bangladesh) has a clause-initial complementizer *je* and a clause-final one *bole* (Bayer (1999)). These complementizers seem to be counterexamples to the analysis presented here in that clause-final subordinators are not smaller than clause-initial ones. However, *kong* has different phonetic forms in clause-initial/final positions. *Bole* has a verb as its origin. The nature of these complementizers needs to be investigated carefully.

found in polar question particles. First, Dryer (2005a: 374) points out that sentence-final question particles often cliticize onto the last word in the sentence, as in (14a) from Majang (Nilo-Saharan, Ethiopia, Unseth 1989: 126) and (14b) from Fyem (Niger-Congo, Nigeria, Nettle 1998: 50).

(14) a. *dɛn-ɛ daaki tolay-ŋ*
see-3Sg Daaki Tolay-Q
'Did Daaki see Tolay?'
b. *taa won aré=n=a*
3Sg.Perf wash clothes=Def=Q
'Did she wash the clothes?'

However, as far as we know, there is no example of sentence-initial question particles cliticizing onto the first word in the sentence. In fact, sentence-initial question particles are often long and heavy, as shown in (15a) from Egyptian Arabic (Gary and Gamal-Eldin 1982: 4) and (15b) from Swahili (Ashton 1947: 151).[7]

(15) a. *huwwa ʔinti gaaja ʔinnaharda*
Q you coming today
'Are you coming today?'
b. *Je, kazi i-me-kwisha?*
Q work SM-Tns-finish
'Is the work finished?'

(15b) shows that sentence-initial question particles can be separated from the sentence by a comma pause.[8]

[7] In (15a), the question particle *huwwa* is the third person independent pronoun 'he,' and the subject pronoun *ʔinti* is the female singular form. For this type of questions 'verificational interrogatives,' see Gary and Gamal-Eldin (1982: 4).
[8] We discuss sentence-initial question particles without stress in Section 4.3.

Second, sentence-final question particles tend to have no distinctive tone on them, as shown in (16).

(16) a. *nǐ lèi ma* (Mandarin Chinese)
you tired Q
'Are you tired?'

b. *ámukátsi mu-lómbé he* (Hunde (Niger-Congo, Congo), Kahombo 1992: 171)
woman NC-lazy Q
'Is the woman lazy?'

Chinese question particles have 'neutral tone' or 'light tone,' as shown in (16a). In Hunde, the question particle *hé* has a floating tone, which is realized on the penultimate syllable of the sentence, as shown in (16b). Sentence-initial question particles tend to have distinctive tone on them, as shown in (17).

(17) a. *lú tûu à sîi* (!Xóõ (Khoisan, Botswana), Traill 1994: 18)
Q people Tns come
'Did the people come?'

b. *mbéni ámukátsí mu-lómbe* (Hunde (Niger-Congo, Kahombo 1992: 171)
Q woman NC-lazy
'Is the woman lazy?'

The initial question particle in (17b) contrasts with the toneless question particle in sentence-final position in (16b) in the same language Hunde.[9]

[9] Dryer (2005a) shows (16b) as *ámukátsí mu-lómbe hé* with a tone on the question particle *hé*. However, the original example given by Kahombo (1992: 171) is (16b) with no tone on the question particle *he,* and on the final syllable in the first word *ámukátsi*.

In this section we have seen that question particles and adverbial subordinators in the sentence-initial position are more separated from the sentence than those in the sentence-final position.

4. PF-movement of Question Particles

4.1 PF-movement of Q from the sentence-initial position

In this section, we consider the reason why the VOQ order is allowed in 135 languages. First, it is important to note that question particles are phonologically light and clitic-like, as we have seen in the last section. We will use -Q (or Q-) to show clitic-like particles below. It is impossible for -Q to stand alone as a prosodic word because of its deficient phonetic features. This is shown as a constraint on question particles in (18a), where # represents a word boundary. -Q must be phonologically incorporated into a word, as shown in (18b).

(18) a.* Word # -Q- # Word
b. [$_{Pwd}$ Word-Q] *or* [$_{Pwd}$ Q-Word]

In (18b), -Q/Q- and a word constitute a prosodic word (Pwd).

Recall the discussion in Section 3 that the juncture between constituents is shorter in left-branching structure than in right-branching structure. Then, juncture between C and IP is shorter in left-branching [$_{CP}$ IP C] than in right-branching [$_{CP}$ C IP]. It is reasonable to assume that a particle can cliticize to an adjacent word across short juncture as in (19a) but not across long juncture as in (19b).

(19) a. [$_{IP}$ ... Wd]-Q
b.* Q- [$_{IP}$ Wd ...]

We propose that to avoid (19b), Q- moves to the right of IP and attaches to the last word in IP to give (19a) in PF. This movement is prosodic and does not violate the syntactic constraint FOFC even if IP or the constituent dominated by IP (e.g. VP) is head-initial ([$_{VP}$ VO]-Q).

Note that heavy particles, represented as **Q**, can stand alone as a prosodic word at the clause-initial position as in (20).

(20) **Q** [$_{IP}$ Wd ...]

Here, a heavy particle in bold face is acceptable even though it is separated from IP by long juncture.[10]

4.2 Positions of question particles and clitics

The PF-movement analysis of sentence-final question particles is supported by the fact that question particles may occur in various positions in the sentence. The result of combining "83 Order of object and verb" and "92 Position of polar question particles" in *WALS* is shown in (21), where figures show the number of languages.[11]

(21)

Q	initial	second	other	final	either of two	total
VO	75	18	6	135	12	246
OV	34	19	2	127	4	186
VO/OV	5	8	0	9	4	26
Total	114	45	8	271	20	458

[10] This analysis does not prohibit heavy question particles **Q** from occurring in sentence-final position. We will discuss the 'or not' type of question particles in VO**Q** in Section 4.3.
[11] VO/OV represents the languages with no dominant order.

For comparison, the result of combining "83 Order of object and verb" and "94 Order of adverbial subordinator and clause" in *WALS* is shown in (22). Note that the classification in (22) is not the same as that in (21).

(22)

AdvSb	initial	internal	suffix	final	mixed	total
VO	279	3	1	2	30	315
OV	54	3	51	85	53	246
VO/OV	26	2	4	2	4	38
Total	359	8	56	89	87	599

From (21) and (22), we can say that polar question particles have a wider variety of distribution in the sentence than adverbial subordinators. It is interesting that about 10 percent of the question particles occur in the second position (45 languages out of 458).

In fact, question particles show a similar distribution to clitics.[12] In particular, question particles, like clitics, may occur in the second position in a sentence. Halpern (1995: 15) classifies second position clitics into 2W (second word) clitics and 2D (second daughter) clitics, as shown in the examples from Serbo-Croatian (23a) and (23b).

(23) a. *Taj =<u>je</u> čovek voleo Mariju* (2W)
that Aux.3s man loved Maria
'That man loved Maria."

b. *Taj čovek <u>je</u> voleo Mariju* (2D)

Halpern (1995) argues that clitics are positioned in the 2W position by Prosodic Inversion which adjoins clitics to the right of a prosodic host, as in (24a). He also

[12] We would like to thank Ian Roberts for pointing out that our analysis of question particles is similar to Halpern's (1995) analysis of second position clitics.

argues that 2D clitics are attached to the right edge of a constituent moved into the initial position in the sentence, as in (24b).

(24) [$_{IP}$ =*je* [$_{IP}$ [$_{NP}$ *Taj čovek*] *voleo Mariju*]]
a. [$_{IP}$ [$_{IP}$ [$_{NP}$ *Taj* =*je čovek*] *voleo Mariju*]]
b. [$_{CP}$ [$_{NP}$ *Taj čovek*] [$_{IP}$ =*je* [$_{IP}$ t *voleo Mariju*]]

Polar question particles show a similar distribution to clitics. Franks (2000: 13) shows that the question particle *li* in Russian can occur in 2W position, as shown in (25).[13]

(25) [$_{\omega}$ *Na ètom*] *li zavode on rabotaet?* (2W)
in this Q factory he works
'Is it in this factory that he works?'

Here, *li* intervenes in the DP *ètom zavode*. Note also that *li* is cliticized to a prosodic word *na ètom*, and not to the first word *na*.

In some languages, the same question particle occurs in more than one position. In Yurok (Algic), the question particle *hes* is usually the second word, but it may occur anywhere except initially (Robins 1958: 139).

(26) a. *kic hes nesk^{W}ecok'^{W} ku wɪʔyɪs* (2W)
Perf Q return the girl
'Has the girl come back yet?'
b. *kic segaʔagey-eʔm hes* (final)
Perf be rich-2Sg/Pl Q
'Are you rich?'

[13] The particle *li* cannot occur as 2D (**Na ètom zavode li on rabotaet?*).

In Warlpiri (Australian), *-nja,* a bound morpheme expressing a question, is appended to the head-word in the question sentence (Capell 1962: 40), as shown in (27a) and (27b).

(27) a. *ŋuridju-nja-nba* (2W)
good-Q-you
'Are you well?'
b. *djadji-buradji ŋuridju-nja* (final)
father-your good-Q
'Is your father well?'

These facts are explained straightforwardly if we assume that question particles originate in clause-initial position and move to the other places in the clause in PF.

Moreover, most of the languages with second-position clitics have question particles in the second position of the sentence. Halpern (1995) shows 10 languages with second-position clitics: Luiseño (Uto-Aztecan, United States), Ngiyambaa (Australian), Serbo-Croatian, Warlpiri (Australian) (2W and 2D); Papago (Uto-Aztecan, Mexico), Pashto (Indo-European, Pakistan), Tagalog (2W or 2D dependent on the construction); Czech (2D); Shuswap (Salishan, Canada), Alsea (Oregon Coast, United States) (2W). Most of these languages have question particles occurring at the second position, as shown in (28).[14]

(28)

	clitic	question particle
a. Czech	2D	no question particle
b. Serbo-Croatian	2W and 2D	initial or second: *da li, zâr* or *li* (Partridge 1964: 32)

[14] Compared to clitics, question particles do not often occur in the 2D position. For example, languages with both 2W and 2D do not allow question particles in the 2D position (see note 12).

c.	Pashto	2W or 2D	initial: *āyā* (Shafeev 1964: 53)
d.	Tagalog	2W or 2D	second: *ba* (Schachter and Otanes 1972: 429, 501)
e.	Warlpiri	2W and 2D	second: *-nja* (Capell 1962: 40)
f.	Ngiyambaa	2W and 2D	second: *-ga* (Donaldson 1980: 260)
g.	Shuswap	2W	initial or second: *ke(n)m* or *-n* (Kuipers 1974: 81)
h.	Alsea	2W	second: *-ā* (Frachtenberg 1920: 24, 28, 285)
i.	Luiseño	2W and 2D	second: *su* 2W (Hyde 1971: 20)
j.	Papago	2W or 2D	initial: *na-/n-* (Saxton 1982: 120, Zepeda 1983: 14, 20)

This fact supports the PF-movement analysis of question particles.

Second-position question particles are a problem for the theories that do not assume PF-movement of question particles, which cannot derive the question particles in (29b) from (29a) straightforwardly.

(29) a. Q [$_{IP}$ α …]
b. α Q [$_{IP}$ …]

One might argue that syntactic movement of α to the left of Q can derive (29b) (cf. Holmberg 2008). However, as we saw in (25), Russian *li* occurs to the right of the sentence-initial prosodic word [$_{ω}$ *na ètam*] and intervenes in the DP *ètam zavode*. It is implausible for a syntactic movement to extract from a DP a prosodic word consisting of two words that are not a constituent.

Languages with question particles in either of two positions are another problem for the theory without PF-movement, which must stipulate that certain types of question particle have a strong EPP feature while the other types do not have one (cf. Biberauer *et al*. 2008). Moreover, as we have seen above, the same question particles may occur in either of two positions in a sentence. It is implausible to assume that the same question particles sometimes have a strong EPP feature and sometimes do not.

Thus, the distribution of question particles supports this analysis that allows movement of question particles in PF.

Before moving onto the next section, let us consider whether adverbial subordinators can also move to the end of IP in PF. Compared to polar question particles just asking for yes or no answers, adverbial subordinators are meaningful elements expressing reason (*for*), time (*when*), condition (*if*) and so on. Morphologically, adverbial subordinators are heavy enough to stand alone as a prosodic word, as shown in (30) (cf. (18a)).

(30) Wrd # **Sb** # Wrd

The juncture between C and IP is shorter in left-branching [IP C] than in right-branching [C IP] structure. A subordinator, if it is light, can cliticize to an adjacent word across short juncture as in (31a) but not across long juncture as in (31b).

(31) a. [$_{IP}$ ... Wrd]-Sb
b. * Sb- [$_{IP}$ Wrd ...]

PF-movement of Sb, a last resort, does not take place to save (b) because an alternative **Sb** # [$_{IP}$ ... Wrd] is available in head-initial (VO) languages.[15]

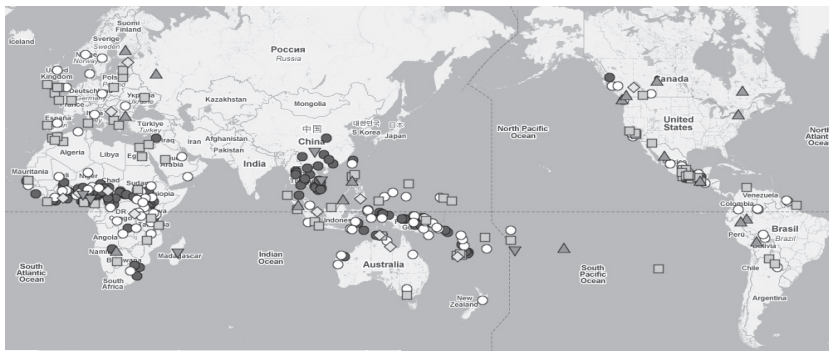
4.3 VOQ order and tone languages

The PF-movement analysis is also supported by the fact that most of the languages with VOQ order are tonal languages. It is interesting to see the geographical overlap

[15] An exception is Yindjibarndi (Australian, Australia), which has suffixal adverbial subordinators and the VO order. This might show that even adverbial subordinators can move from the sentence-initial position in PF.

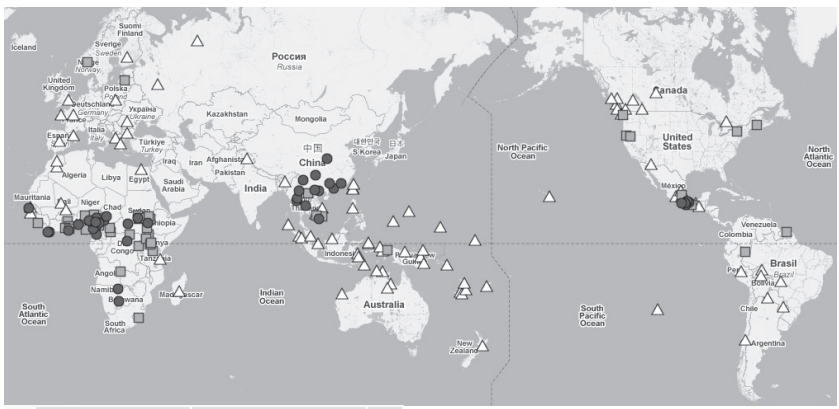
between VOQ languages and tonal languages, as shown in Map 1 and Map 2.

(Map 1) *Position of Polar Question Particles in VO Languages*



□	VO	Initial	75
●	VO	Final	135
△	VO	Second position	18
▽	VO	Other position	6
◇	VO	In either of two positions	12
○	VO	No question particle	106

(Map 2) *Tone*



△	VO	No tones	89
□	VO	Simple tone system	46
●	VO	Complex tone system	40

Both VOQ languages and VO languages with a complex tone system are located in Africa and Southeast Asia. In fact, examination of the data in *WALS* shows that out of 135 VOQ languages, only 10 languages have no tone. Seven languages of them are located in New Guinea and Australia. Moreover, some of these languages have the *or-not* type of question particles (cf. Bencini 2007). For example, Arapesh (Torricelli, Papua New Guinea) has *o (wak)* 'or (not),' Khmer (Austro-Asiatic, Cambodia) *(rɯ:) (tẹ:)* '(or) (not),' Lenakel (Austronesian, Vanuatu) *ua (kapwa)* 'or (not)' and Tetun (Austronesian, East Timor) *ká lale* 'or no.' Others have the clitic type of question particles (Koromfe (Niger-Congo, Burkina Faso), Maybrat (West Papuan, Indonesia), Tiwi (Australian) and Tukang Besi (Austronesian, Indonesia)).

Let us consider the correlation between the VOQ order and tone complexity. Examination of data in *WALS* shows that nearly half of complex tone languages have VOQ order (45.0%) and that over one third of simple tone languages have VOQ order (37.0%). As for languages without tone, only 10 out of 89 languages have VOQ order (11.2%).

(32)

	VO	VOQ	VOQ/VO %
No tones	89	10	11.2
Simple tone system	46	17	37.0
Complex tone system	40	18	45.0
Total	175	45	25.7

Thus, tonal languages are more likely to have VOQ order than non-tonal languages.

The next question to ask is why this is the case. Particles in tonal languages do not have distinctive tone, as we have seen in (16) above. Question particles have 'light tone' in Mandarin Chinese and floating tone realized on the preceding word in Hunde. Then, in tonal languages, question particles must cliticize to another word with tone. However, a clause-initial question particle cannot cliticize to the following word

because of the long juncture in right-branching structure, as we argued in Section 3.1. Thus, question particles move to another position in a clause to cliticize to a tone-bearing word.

On the other hand, question particles in non-tonal languages are likely to have their own stress and do not have to cliticize to other words. As we have seen in (15), Egyptian Arabic and Swahili have clause-initial question particles, which are independent words. Question particles in non-tonal languages may also stand alone even if they do not have stress, as shown in (33).

(33) a. Lithuanian
Ar̃ jũs esate lietùvis?
Q you be Lithuaninan
'Are you a Lithuanian?'

b. Polish
Czy te jabłka są słodkie?
Q this apple be sweet
'Is this apple sweet?'

These particles do not have phrasal stress but can stand in the sentence-initial position. This case can often be seen in VO languages in Europe.

Let us summarize the arguments we have presented so far. In tonal languages, particles are likely to have a light tone, which must be adjacent to another tone. However, sentence-initial light tones are impossible because of long juncture. Question particles must move to another position where they may depend on the preceding tone. Sentence-initial unstressed particles can be more independent of an adjacent syllable than particles in tonal languages. Then, we can present a dependency hierarchy of question particles from the most dependent to the least dependent, as in (34).

(34) Q (light tone) < Q (unstressed) < **Q** (tone/stressed)
* Q- # IP → IP-Q ?Q # IP (→ IP-Q) **Q** # IP

(34) shows that question particles in tone languages must move from the sentence-initial position in PF if they have a light tone, while those in stress languages may stay in sentence-initial position even if they are unstressed. We consider that phonological dependency is the reason why VOQ order occurs more often in tone languages than in stress (no tone) languages. We can assume a similar dependency hierarchy in the case of adverbial subordinators, as shown in (35).

(35) * Sb (light tone) < Sb (unstressed) < **Sb** (tone/stress)
* Sb-#IP (→ IP-Sb) ?Sb # IP (→ IP-Sb) **Sb** # IP

The difference between question particles and adverbial subordinators is that the former tend to be light and the latter tend to be heavy, reflecting their semantic weight. Thus, VOQ order (IP-Q) is commonly found in many languages while VOSb order (IP-Sb) is rare.

Thus, we can explain the typology of question particles in terms of the PF-movement of question particles, the junctural asymmetry of left/right-branching, the differences in size between particles and adverbial subordinators, and distinctive/light tone and stressed/unstressed particles.

5. Conclusion

To conclude, polar question particles, especially those in tonal languages, are likely to depend phonologically on the adjacent element, which is possible in sentence-final position but not in sentence-initial position because of the long juncture in right-branching structure. As a last resort, polar question particles may move to other

positions including the sentence-final position in PF in VO languages. Thus, sentence-final polar question particles in VO languages are not real counterexamples to the syntactic constraint FOFC, which does not apply to the prosodic movement of IP to the left of a question particle. We also hope that this analysis based on the length of the head can be extended to heads other than particles (e.g. affixes and negatives), some of which are counterexamples to FOFC.

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