Reconsidering the Edge Parameter

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1. Introduction

The edge based theory of prosodic hierarchy (Selkirk 1986, among others) has succeeded in explaining typological differences between languages. In this paper, I will derive the edge parameter from the head parameter in syntax and discuss the difference in phrasing between Shanghai and other Chinese dialects. In section 2, I will briefly review the edge parameter theory of Selkirk (1986) and the prosodic difference between Xiamen and Shanghai. Section 3 illustrates the bare mapping from syntactic structure onto phonological representation (Tokizaki 1999, 2008). Section 4 discusses how the differences between Chinese dialects can be explained without the edge parameter. Section 5 concludes the discussion.[1]

2. The Edge Based Theory of Prosodic Hierarchy

First, let us reconsider the edge parameter proposed by Selkirk (1986) and Chen (1987). The end-based theory assumes that languages have an edge parameter in prosodic phrasing whose values are right or left. For example, Chi Mwi:ni shows that the right edge of a lexically headed XP is a phonological phrase boundary.

(1) a. $[_{VP}\ [_{V'}\ [_{V}$ pa(:)nzize] $[_{NP}$ cho:mbo]] $[_{NP}$ mwa:mba]]
'He ran the vessel on to the rock'
b. .....……..... $]_{Xmax}$ ….....$]_{Xmax}$
c. $_{PPh}$(_____) $_{PPh}$(_____)

Selkirk argues that in (1) the left edge of the NP *cho:mbo* does not make a prosodic boundary, but its right edge does.

On the other hand, Selkirk and Tateishi (1988, 1991) argue that in Japanese the value of the phrasing parameter is left. The following example shows that verbs take their complements to their left (Selkirk and Tateishi 1991: 524):

(2) a. $[_{S}\ [_{NP}\ [_{NP}$ Ao'yama-no] $[_{N}$ Yama'guchi-ga]] $[_{VP}\ [_{NP}$ ani'yome-o] $[_{V}$ yonda]]]
Aoyama-from Yamaguchi-Nom sister-in-law-Acc called
'Mr. Yamaguchi from Aoyama called his sister-in-law.'
b. $_{MaP}$(Ao'yama-no Yama'guchi-ga) $_{MaP}$(ani'yome-o yonda)

They argue that the right edge of the NP *ani'yome-o* does not make a Major Phrase boundary but its left edge does.

In this way, according to the end-based theory, languages can be grouped in terms of the edge parameter of prosodic phrasing. The following is a list of languages that have right and left as the edge parameter value:

(3) Right edge of lexically headed XPs:
Chi Mwi:ni (Kisseberth and Abasheikh 1974, Selkirk 1986)
Kimatuumbi (Odden 1987)

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[1] A part of this paper is based on Section 3.1 in Tokizaki (2008). I would like to thank Lisa Selkirk for her comments on the idea presented there. I also thank two annonimous reviewers for their valuable comments on an earlier version of this paper.

Xiamen (Chen 1987)
Papago (Hale and Selkirk 1987)

(4) Left edge of lexically headed XPs:
Ewe (Clements 1978)
Japanese (Selkirk and Tateishi 1991)
Korean (Cho 1990)
Northern Kyungsang Korean (Kenstowicz and Sohn 1997)
Shanghai Chinese (Selkirk and Shen 1990)

Notice that there seems to be a parallelism between the syntactic head parameter and the prosodic edge parameter. Head-initial (*i.e.* complement-right) languages such as Chi Mwi:ni (cf. (1)) and Xiamen have right edge as the parameter value, and head-final (*i.e.* complement-left) languages such as Japanese (cf. (2)) and Korean have left as the value. It is desirable if we can dispense with the edge parameter by deriving its effect from the head parameter. In the next section, I will briefly illustrate the bare mapping theory I proposed in Tokizaki (1999, 2008).

Note here that We cannot explain optional tone sandhi in Shanghai straightforwardly if we suppose that the phrase structure of Shanghai is the same as that of Xiamen, as Hale and Selkirk (1987: 179) argue. One possible explanation is to suppose that the prosodic domain in Shanghai is smaller than that in Xiamen. See also Selkirk and Shen (1990: 335). This issue is discussed in Section 3.1.3 in Tokizaki (2008). However, I will reconsider it in Section 4 below focusing on phonological properties in Shanghai.

3. Bare Mapping from Syntax onto Phonology

3.1 Bare Mapping

First, let us reconsider the example (1) from Chi Mwi:ni in terms of bare phrase structure (cf. Chomsky 1995).

(5) $[_{VP}\ [_{V'}\ [_{V}$ pa(:)nzize$]\ [_{N}$ cho:mbo$]]\ [_{N}$ mwa:mba$]]$

Chi Mwi:ni is head-initial (*i.e.* complement-right) and has right as the edge parameter value. We can explain why this is the case with the bare mapping theory. In Tokizaki (1999, 2008), I proposed the following mapping rule as shown in (6).[2]

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[2] The mapping rule (6) can be considered as a generalized version of Chomsky and Halle's (1968: 366) #-Insertion:

(i) The boundary # is automatically inserted at the beginning and end of every string dominated by a major category, i.e., by one of the lexical categories "noun," "verb," "adjective," or by a category such as "sentence," "noun phrase," "verb phrase," which dominates a lexical category.

or as a generalized version of Selkirk's (1984: 314) Silent Demibeat Addition, which articulates the syntactic timing of a sentence:

(ii) Silent Demibeat Addition
Add a silent demibeat at the end of the metrical grid aligned with
a. a word
b. a word that is the head of a nonadjunct
c. a phrase

(6) Interpret boundaries of syntactic constituents […] as prosodic boundaries / … /.

Now let us consider the reported data in turn. First consider Chi Mwi:ni (5). As we have seen, the mapping rule places the minimum number of prosodic boundaries, that is two, between heads and non-branching complements, i.e. *pa(:)nzize* and *cho:mbo*, because they are sisters in phrase structure. It also places three boundaries between the first object and the second object if they are non-branching, as shown in (7).

(7) /// pa(:)nzize // cho:mbo /// mwa:mba //

If we apply the boundary deletion rule (8), which I proposed in Tokizaki (1999, 2008), with *n*=2 to (7), we have the demarcated string as in (9).

(8) Delete *n* boundaries between words. (*n*: a natural number)
(9) / pa(:)nzize cho:mbo / mwa:mba (*n*=2)

This is the correct prosodic phrasing for the sentence. The left edge of the first object does not make a prosodic boundary because the object is the sister of the preceding verb. The right edge of the object makes a prosodic boundary because the second object is not the sister of the first object, but the sister of the category branching into the verb and the first object. Thus we do not have to specify the edge parameter of the language as right. The phrasing pattern is predicted from phrase structure.

This also holds with head-final languages like Japanese. As the examples in (2) show, verbs take their complements to their left. I will show bare phrase structure and the result of applying the mapping rule (6) together below. Consider (10) for example.

(10) a. $[_S\ [_{NP}\ [_{NP}$ Ao'yama-no] $[_N$ Yama'guchi-ga]] $[_{VP}\ [_{NP}$ ani'yome-o] $[_V$ yonda]]]
Aoyama-from Yamaguchi-Nom sister-in-law-Acc called
'Mr. Yamaguchi from Aoyama called his sister-in-law.'
b. $_{MaP}$(Ao'yama-no Yama'guchi-ga) $_{MaP}$(ani'yome-o yonda)

In (10a), the subject NP branches. So there are four boundaries between the head of the subject NP *Yamaguchi-ga* and the object NP *ani'yome-o*, and only two boundaries between the verb *yonda* and its object *ani'yome-o*, as shown in (11a). The Boundary Deletion (8) with *n*=2 applies to (11a) to give (11b).

(11) a. /// Ao'yama-no // Yama'guchi-ga //// ani'yome-o // yonda ///
b. / Ao'yama-no Yama'guchi-ga // ani'yome-o yonda / (*n*=2)

We can explain the phrasing (10b) straightforwardly, as shown in (11b), without assuming that Japanese has left as the edge parameter value.

3.2 Syntactic Constituents and Prosodic Boundaries

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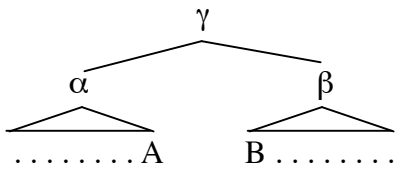
d. a daughter phrase of S.

The mapping rule (6) differs from Chomsky and Halle's #-Insertion (i) in that it counts all syntactic objects whether they are major categories N, V, A and their projections or not. The crucial difference between the mapping rule (6) and Selkirk's Silent Demibeat Addition (ii) is that only the former counts the beginning of a category as well as the end.

Let us consider the relation between syntactic constituents and prosodic boundaries in general. Suppose that α and β are sisters of γ, and that A and B are as follows: A is a word dominated by and is the right edge of α; B is a word dominated by and is the left edge of β. Or α equals A and β equals B. This is shown with a tree diagram in (12).

(12)



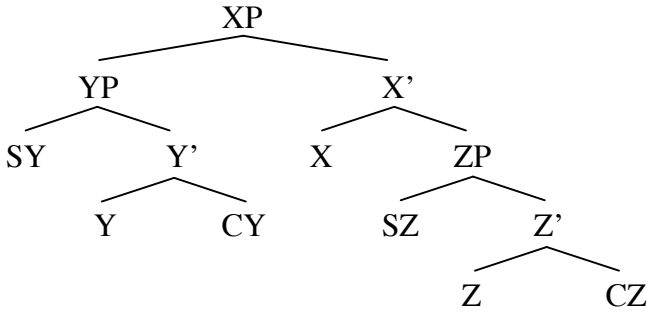
This is shown with brackets in (13) where possible brackets are italicized.

(13) $[_{\gamma}\ [_{\alpha}$ . . . *[* . . . *[* . . . A*]]*] $[_{\beta}$ *[[* B . . . *]* . . . *]* . . .]]

We can make the following generalization. The number of boundaries between words is at its minimum when both α and β are non-branching. The deeper A or B is embedded in α or β, the larger the number of brackets between A and B becomes.

Let us consider what phonological representations the mapping rule makes in different syntactic structures. First consider the syntactic structure of head initial languages. For example, look at the following right-branching structure where X-Z is a head word, S specifier, and C complement. SY, for example, shows the specifier of Y.

(14)



Here I show the X-bar theoretic structure for the purpose of exposition. (14) is represented as (15) with brackets.

(15) $[_{XP}\ [_{YP}$ SY $[_{Y'}$ Y CY]] $[_{X'}$ X $[_{ZP}$ SZ $[_{Z'}$ Z CZ]]]

Applying the bare mapping rule (5), we get the following representation:

(16) // SY / Y CY /// X / SZ / Z CZ ///

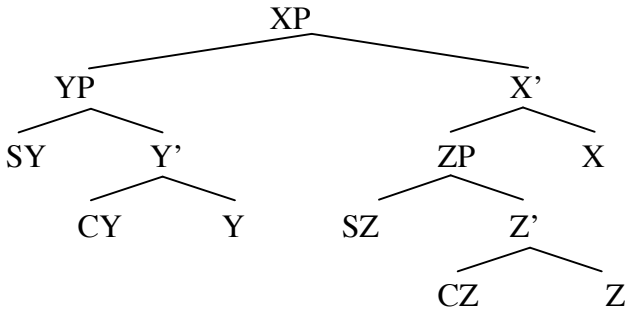
The number of boundaries between CY and X is three. CZ also has three boundaries to its right. CY is on the right edge of YP, and CZ is in the right edge of ZP and XP. On the other hand, the number of boundaries between X and SZ is one. SY has two boundaries to its left. SZ is on the left edge of ZP, and SY is on the left edge of YP and XP. Thus, bare mapping theory predicts more boundaries at the right edge of a maximal projection in right-branching structure than at the left edge.

(17)

//		SY /	Y CY	///	X /	SZ /	Z CZ ///
$[_{XP}\ [_{XP}$		SY	Y CY]		X $[_{XP}$	SZ	Z CZ]]

Next, consider the syntactic structure of head final languages. For example, look at the following (partly) left-branching structure where I assume that specifiers are merged at the left of the intermediate projection of heads:

(18)



(18) is represented as (19) with brackets.

(19) $[_{XP}\ [_{YP}$ SY $[_{Y'}$ CY Y]] $[_{X'}\ [_{ZP}$ SZ $[_{Z'}$ CZ Z]] X]]

Applying the bare mapping rule (6), we get the following representation:

(20) // SY / CY Y //// SZ / CZ Z // X //

The number of boundaries between Y and SZ is four. SY has two boundaries to its left. SZ is in the left edge of ZP, and SY is in the left edge of YP and XP. On the other hand, the number of boundaries between Z and X is two. X has two boundaries to its right. SZ is in the left edge of ZP, and SY is in the left edge of YP and XP.

(21)

	//	SY /	CY Y ////	SZ /	CZ Z //	X //	
$[_{XP}\ [_{YP}$	SY	CY Y]	$[_{ZP}$	SZ	CZ Z]	X]	

The position between Y and SZ corresponds to both the right edge of YP and the left edge of ZP in (21). Things are not as clear as in the right-branching case. However, if the position between Z and X, which corresponds to the right edge of ZP, does not block any prosodic rule, we may conclude that the left edge of a maximal projection is more relevant in prosodic phrasing than its right edge. This is what the end based theory predicts in right-branching structure. Bare mapping can make the same prediction as shown in (21).

4. Phonological Differences between Taiwanese and Shanghai

4.1 Domain size difference

In this section, I will discuss how the differences between Chinese dialects can be explained without the edge parameter. First, I show that Shanghai Chinese has smaller prosodic units than other dialects of Chinese. In section 4.2, I argue that the domain size difference arises from the difference of syllable structure: Shanghai has CV syllables only while other Chinese dialects have many CVG or CVC syllables (cf. Duanmu 2008). In section 4.3, I discuss the effects of rhythm, functional words and compounds on prosodic phrasing.

The most difficult problem for bare mapping theory is to explain the different parameter values among Chinese dialects. As the lists in (3) and (4) show, the value of the edge parameter is reported to be right in the Xiamen dialect and left in Shanghai Chinese

(Chen 1987, Selkirk and Shen 1990). These languages share basic properties of grammar, especially word order and phrase structure. Both languages are syntactically head initial. If we are trying to derive the edge parameter from the syntactic head parameter, how can we make a prosodic difference in two languages that have the same parametric value of the syntactic parameter?

One solution is to suppose that the sensitivity to boundaries is different in the two languages. Let us first consider the rules and the data of these languages. Chen (1987: 131) argues that Tone Group Formation in Xiamen can be formulated as (22).

(22) Mark the right edge of every XP with #, except where XP is an adjunct c-commanding its head.

The rule (22) correctly predicts the tone group boundary (#) in (23a) and (23b).

(23) a. *yi tsiong hit pun ts'eq # sang hoo tang-oq*
he Obj-marker that Cl book give to schoolmate
'He gave that book to his schoolmate.'

b. *yi kap tang-oq # kai-siao tsit e lu-ping-yu*
he to schoolmate introduce one Cl girlfriend
'He introduced a girlfriend to his schoolmate.'

hit pun ts'eq in (23a) and *kap tang-oq* in (23b), which are XPs, have a tone group boundary to their right.

Selkirk and Shen (1990: 320, 332) argue that Shanghai Chinese has syntax-phonology mapping rules with the parameter setting in (24) and (25).

(24) Shanghai Chinese Prosodic Word Rule: (p. 320)
Prosodic Word: {Left, Lex^0}
where Lex^0 stands for word belonging to the lexical categories N, V, A.

(25) Shanghai Chinese Major Phrase Rule: (p. 332, p. 328)
Major Phrase: {Left, Lex^{max}}

Shanghai and Xiamen have almost the same syntax, but their edge parameter values seem to be different. First, let us examine the data shown by Selkirk and Shen (1990).

(26) a. 'zaw 'mo
toward horse
(LH) (LH)
'toward the horse'

b. peq 'mo tshaw
give horses vegetables
(MH) (LH) (MH)

(26a) is a crucial example. Prepositions and their objects make their own prosodic phrase. This is also the case with verbs and their objects as shown in (26b). Remember that in Xiamen, prepositions or verbs and their objects are grouped into the same prosodic phrase, as shown in (23a) and (23b).[3]

How can we derive prosodic phrasing in Shanghai if we eliminate the phonological edge parameter? First, note that the prosodic domain in Shanghai is smaller than that of Xiamen or Taiwanese. Consider the following examples from Yip (2002: 118):

(27) V-NP

a. Taiwanese: One tonal domain
   [$_V$ pang] [$_{NP}$ hong-ts'e] 'fly kite'
   fly kite

b. Shanghai: Two tonal domains
   [$_V$ taN] # [$_{NP}$ 'niN] 'hit people'
   hit people

As shown in (24), Selkirk and Shen (1990) also assume that the prosodic domain is prosodic word in Shanghai, unless there is focus effect. Then, if we assume that the variable *n* in the boundary deletion rule (8) is relatively small, say *n*=1, in Shanghai, we can explain the data in (26).

(28) a. [$_{PP}$ [$_P$ 'zaw] [$_N$ 'mo]]
   toward horse
   'toward the horse'

b. // 'zaw // 'mo //

c. / 'zaw / 'mo / (*n*=1)

d. (LH) (LH)

(29) a. [$_{VP}$ [$_V$ peq] [$_N$ 'mo] [$_N$ tshaw]]
   give horses vegetables

b. // peq // 'mo // tshaw //

c. / peq / 'mo / tshaw / (*n*=1)

d. (MH) (LH) (MH)

The phrase structures in (28a) and (29a) are interpreted as (28b) and (29b) by the mapping rule (5) and some of their boundaries are deleted as in (28c) and (29c) to make the prosodic domain shown in (28d) and (29d).

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[3] Shanghai Chinese Prosodic Word Rule (24) has a minor problem in explaining the phrasing of preposition phrases in citation form such as (26a). The left edge of the first prosodic word corresponds to the left edge of the preposition *'zaw*. However, the rule in (24) cannot assign a prosodic word boundary to the left edge of P.

4.2 Phonological properties in Shanghai

A question arises here: why does Shanghai prefer small tonal domain? In our terms, why does Shanghai set the number of boundaries to be deleted (*n*) as 1 instead of 2? To answer this question, we need to consider phonological properties in Shanghai carefully. Selkirk and Shen (1990) show three rules applying in a Prosodic Word: Obligatory Tone Deletion, LR Association and Contour Tone Association:

(30) Obligatory Tone Deletion

$(T_i\ T_j \ldots T_k \ldots)_{PW} \rightarrow (T_i\ T_j \ldots \ldots)_{PW}$

This rule deletes all the tones following the first pair of tones in a prosodic word domain. LR Association associates the second tone with the second syllable in a prosodic word, as shown in (31).

(31) LR Association

$(T_i\ T_j \ldots)_{PW} \rightarrow (T_i\ T_j \ldots)_{PW}$

$\sigma\ \sigma \ldots \qquad \sigma\ \sigma \ldots$

Contour Tone Association associates the last pair of tones T_i T_j with the last syllable in a prosodic word, as shown in (32).

(32) Contour Tone Association

$(\ldots T_i\ T_j)_{PW} \rightarrow (\ldots T_i\ T_j)_{PW}$

$\sigma \qquad \sigma$

Duanmu (2008) argues that Shanghai, which has CV syllables only, shows tone split, where contour tones break into level tones. Tone split is illustrated as in (33).

(33) Tone split in Shanghai

Surface	H	L	L	H	L	H
Citation	HL	0	L-H	0	L-H	0
	fii	*ləʔ*	*see*	*ləʔ*	*zee*	*ləʔ*
	‘flew’		‘broke’		‘earned’	

In contrast, other Chinese languages such as Standard Chinese, which have many CVX syllables (CVG and CVC), show stable tones.

(34) Lack of tone split in Standard Chinese

Surface	HL	(L)	LH	(L)	L	H
Citation	HL	0	LH	0	L-H	0
	mai	*lə*	*lai*	*lə*	*mai*	*lə*
	‘sold’		‘came’		‘bought’	

Suppose that Shanghai set the number of boundaries to be deleted as 2 (n=2) for Boundary Deletion. Then the examples in (28) and (29) would be (35) and (36).

(35) a. $[_{PP}\ [_{P}$ ‘zaw] $[_{N}$ ‘mo]]
toward horse
‘toward the horse’
b. // ‘zaw // ‘mo //
c. ‘zaw ‘mo (n=2)
d. (L H) ← LH ~~LH~~

(36) a. $[_{VP}\ [_{V}$ peq] $[_{N}$ ‘mo] $[_{N}$ tshaw]]
give horses vegetables
b. // peq // ‘mo // tshaw //
c. peq ‘mo tshaw (n=2)
d. (M H) ← MH ~~LH MH~~

Boundary Deletion would delete all the boundaries between words to give a tonal domain extending over all the words. However, this phrasing would make Tone Deletion delete the tone of nouns, which carry the most important information in the phrase. Thus, this phrasing must be avoided. Note that it is not possible to delete the tone of preposition or verb in order to keep the tone of nouns as shown in (37) and (38).

(37) a. ‘zaw ‘mo (n=2)
b. (LH) ← ~~LH~~ LH

(38) a. peq ‘mo tshaw (n=2)
b. (LH MH) ← ~~MH~~ LH MH

This is impossible because Tone Deletion cannot delete the tone on the left in a tonal domain as formulated in (30). Moreover, even if the deletion of the tone of preposition or verb, no tone can be assigned to them by Tone Association, which applies only to the syllables on the right in a tonal domain as formulated in (32). Thus, Shanghai chooses small tonal domain in order to keep the tone of nouns.

Other dialect of Chinese have tone sandhi, which changes tones preceding the final tone in a tonal domain. For example, Beijing Chinese (Standard Chinese) has a tone sandhi rule which changes a sequence of third tones preceding the final third tone in a tonal domain. Chen (2000: 26) shows the following formulation of the tone sandhi:

(39) Beijing T3 Sandhi

T3 → T2 / ___ T3
T2 = MH
T3 = L

Let us look at an example in (40).

(40) a. *leng shui*
cold water
L L base
MH L sandhi
b. *mai ma*
buy horse 'to buy a horse'
L L base
MH L sandhi

In (40), the complement of verb keeps its base tone while the verb changes its tone. No tone is deleted in a tonal domain in Standard Chinese. Thus, the deletion of prosodic boundaries between words can make a large tonal domain without deleting tone on the lexical item carrying important information. In other words, both Standard Chinese and Shanghai Chinese keep the tone of the object of verb or preposition. Thus, tone must be on the lexical items with important information in any language. Shanghai Chinese needs to divide sentences into small prosodic units in order to keep tone on the lexical items with important information.

4.3 Rhythm, function words and compounds

4.3.1 V-P/N

Let us consider three other types of phrasing in Shanghai: V-P/N, V-D/N and V-Q-CL/N. Yip (2002: 121) suggests that the prosodic domain in Shanghai is determined partly by rhythm. First, look at the following examples from Selkirk and Shen (1990: 321), which have the V-P/N phrasing pattern:

(41) a. [$_{VP}$ [$_{V}$ 'z] [$_{PP}$ [$_{P}$ 'laq] [$_{N}$ 'zawNhe]]
live at Shanghai
(L H) (L H) <- LH ~~LM~~ LH ~~MH~~
'live in Shanghai'
b. [$_{VP}$ [$_{V}$ tsou] [$_{PP}$ [$_{P}$ taw] [$_{N}$ 'noetsiN]]
walk to Nanjing
(M H) (L H) <- MH ~~MH~~ LH ~~HL~~

Selkirk and Shen (1990) explain this phrasing by the reference to the types of lexical categories in their formulation of Prosodic Word Rule (24), which is repeated here as (42).

(42) Shanghai Chinese Prosodic Word Rule: (p. 320)
Prosodic Word: {Left, Lex^0}
where Lex^0 stands for word belonging to the lexical categories N, V, A.

In (42), the lexical categories are restricted to N, V and A, with P excluded. Thus, the left edge of preposition does not make a prosodic boundary.

This formulation of phrasing rule correctly explains the data in (41), which has the V P N sequence phrased as (V P) (N). However, they do not show why P is not included into the lexical categories. Selkirk and Shen (1990) show good observation of the phrasing facts, but we would like to know the reason behind their observation. Instead of postulating the edge parameter in (42), let us try to explain the phrasing in (41) with the bare mapping below.

For example, the verb phrase in (41a) has the phrase structure in (43a), which is mapped onto the phonological structure in (43b) by the mapping rule in (6).

(43) a. $[_{VP}\ [_{V}$ ‘z] $[_{PP}\ [_{P}$ ‘laq] $[_{N}$ ‘zawNhe]]]
live at Shanghai
b. // ‘z /// ‘laq // ‘zawNhe ///

Boundary Deletion (8) with *n*=2 would derive a wrong phrasing pattern in (44).

(44) a. ‘z / ‘laq ‘zawNhe / (*n*=2)
b. ‘z ‘laq ‘zawNhe
(LH) (L M) <- LH LM ~~LH~~ ~~MH~~

This phrasing would delete the tone of N *‘zawNhe*, violating the constraint on deletion of tone on important information. This phrasing is avoided in Shanghai. Then, how is the V P N sequence phrased into (V P) (N)?

I argue that two points are involved in the phrasing in (41). One is that the nouns in (41) in fact have two morphemes. The other is that prepositions are phonologically light and are likely to depend on the adjacent word. Let us look at each of them in turn.

First, note that each noun in (41) consists of two morphemes. *‘zawNhe* and *‘noetsiN* are a kind of compound noun as is evident from the fact that they consist of two Chinese characters (Shanghai 上海 is ‘up-sea’ and Nanjing 南京 is ‘south-city’). I would like to argue that compound nouns N can be analyzed as $[_{N}\ [_{N}$ …] $[_{N}$ …]] with its internal constituent structure. Then, the following structure is the input to the syntax-phonology mapping rule:

(45) a. $[_{VP}\ [_{V}$ ‘z] $[_{PP}\ [_{P}$ ‘laq] $[_{N}\ [_{N}$ ‘zawN] $[_{N}$ he]]]]
b. $[_{VP}\ [_{V}$ tsou] $[_{PP}\ [_{P}$ taw] $[_{N}\ [_{N}$ ‘noe] $[_{N}$ tsiN]]]]

Then the mapped phonological representations are (46a) and (46b).

(46) a. // ‘z /// ‘laq /// ‘zawN // he ////
b. // tsou /// taw /// ‘noe // tsiN ////

It is not unnatural to put a prosodic boundary between the preposition and its object because there are three boundaries there (the maximum sequence in the example), as well as between the verb and the preposition. Eurhythmic considerations may well govern the actual phrasing.[4]

Second, prepositions in general are phonologically light and are likely to depend on the adjacent word. In this sense, prepositions may behave like enclitics. To review the discussion of clitics in Tokizaki (2008), consider the examples in (47).

(47) a. Línda plays ténnis.
b. She pláys it.

I assume that (47b) has the syntactic representation (48a) which is interpreted as (48b).

(48) a. [She [pláys] it]
b. / She / plays / it /

As shown in (48a), I assume that clitics and unstressed function words have a boundary on only one side of them. The side without consonants are likely to have no boundary. *She* has a boundary on its left and *it* has a boundary on its right.

Let us go back to Shanghai examples in (42), which have a preposition prosodically grouped with the verb. This may suggest that the prepositions in these examples have no boundary on their left as shown in (49).

(49) a. $[_{VP}\ [_{V}$ ‘z] $[_{PP}$ ‘laq] $[_{N}\ [_{N}$ ‘zaw] $[_{N}$ Nhe]]]]

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[4] A reviewer points out that this claim also predicts that there will not be a prosodic boundary between a preposition and its complement if the complement is not a compound noun. In this case we would have the structure in (i), which is interpreted as (ii).

(i) $[_{VP}\ [_{V}$ ‘z] $[_{PP}$ ‘laq] $[_{N}$ …]]]
live at …
‘live in …’

(ii) // ‘z // ‘laq // … ///

In fact, we do not predict a prosodic boundary between P and N in (i) because there are only two boundaries there in (ii). However, we do not predict one between V and P either. Moreover, Chinese place names consist of two words as in (45), although there might be some exceptions that I do not know. Since I cannot test this case now, I will leave this matter for future research.

live at Shang- hai
'live in Shanghai'

b. [$_{VP}$ [$_{V}$ tsou] [$_{PP}$ taw] [$_{N}$ [$_{N}$ 'noe] [$_{N}$ tsiN]]]]
walk to Nan- jing

Here it is assumed that prepositions *'laq* and *taw* have no boundary on their left. The syntactic structure in (49) are mapped onto the phonological structure in (50).

(50) a. // 'z // 'laq /// 'zaw // Nhe ////
b. // tsou // taw /// 'noe // tsiN ////

The Boundary Deletion with *n*=2 gives the right prosodic phrasing as shown in (51).

(51) a. 'z 'laq / 'zaw Nhe // ('z 'laq) ('zaw Nhe)
b. tsou taw / 'noe tsiN // (tsou taw) ('noe tsiN)

The phrasing in (51) allows the verb and the first noun to keep its base tone within the prosodic domain, as shown in (41).

4.3.2 V-D/N

These points are also the case with a personal pronoun embedded as a possessive in a post verbal noun phrase as in (52), which shows the V-D/N phrasing pattern.

(52) a. [$_{VP}$ [$_{V}$ taN] [$_{DP}$ [$_{D}$ 'ngu] [$_{N}$ 'njitsz]]]
hit 1SG son
(M H) (L H) <- MH ~~LH~~ LH ~~MH~~
'hit my son'

b. [$_{VP}$ [$_{V}$ taN] [$_{DP}$ 'ngu] [$_{N}$ [$_{N}$ 'nji] [$_{N}$ tsz]]]]
c. // taN // 'ngu /// 'nji // tsz ////
d. taN 'ngu / 'nji tsz // (*n*=2)

The structure (52a) can be analyzed as (52b) where *'nji-tsz* 儿子 is a compound and a personal pronoun *'ngu* is like a clitic. The bare mapping applies to (52b) to give (52c), which is changed into (52d) by Boundary Deletion with *n*=2. The phrasing in (52d) correctly predicts the prosodic units in (52a), where the verb and the noun keep their base tone.

4.3.3 V-Q-CL/N

However, there are some data which need careful examination. The following examples have four words, which are in a group of three words and a single word (V-Q-CL/N):

(53) a. [$_{VP}$ [$_{V}$ taw] [$_{NP}$[$_{QP}$ [$_{Q}$ ʔiq] [$_{CL}$ pe]] [$_{N}$ ‘zo]]]

pour one cup tea
(M H L) (LH) <- MH ~~MH~~ ~~HL~~ LH
‘pour a cup of tea’

b. [$_{VP}$ [$_{V}$ ‘ma] [$_{NP}$[$_{QP}$ [$_{Q}$ tsi] [$_{CL}$ po]] [$_{N}$ taw]]]

buy how many knife
(L H L) (HL) <- LH ~~MH~~ ~~MH~~ HL
‘buy some knives’

These examples show that eurhythmic consideration is not always the crucial factor in phrasing in Shanghai. Selkirk and Shen (1990) argue that focus or semantic weight is involved in Shanghai. I speculate that this is the case in these examples as well. Duanmu (1992: 74) argues that *ʔiq* and *pe* in (53a) are ‘function words’ which do not carry stress. *Taw* and *‘zo* are stress bearing units. This claim can be supported by the following examples, also from Selkirk and Shen (1990):

(54) a. [$_{VP}$ [$_{V}$ taw] [$_{NP}$[$_{QP}$ [$_{Q}$ ʔiq] [$_{CL}$ pe]] [$_{N}$ ‘zo]]]

pour one cup tea
(MH) (M H) (LH) <- MH MH ~~HL~~ LH
‘pour one cup of tea’

b. [$_{VP}$ [$_{V}$ ‘ma] [$_{NP}$[$_{QP}$ [$_{Q}$ tsi] [$_{CL}$ po]] [$_{N}$ taw]]]

buy how many knife
(LH) (M H) (HL) <- LH MH ~~MH~~ HL
‘how many knives ... buy?’

In (54a) and (54b), *ʔiq* and *tsi* are used as quantifiers. These words can start their own domains and keep their base tone if they have semantic content. This fact is not surprising if we assume bare mapping theory.

(55) a. // taw //// ʔiq // pe /// ‘zo ///

b. // ‘ma //// tsi // po /// taw ///

If we apply the boundary deletion rule with *n*=2, we get the right phrasing:

(56) a. taw // ʔiq pe / ‘zo /

b. ‘ma // tsi po / taw /

Note that *pe* and *po* are used here as classifiers instead of nouns in these examples and need not keep their base tones.

To sum up the discussion in this section, I argued that the difference of phrasing between Shanghai Chinese and other Chinese dialects can be explained without the edge parameter. Shanghai Chinese has smaller prosodic units than other dialects of Chinese because Shanghai has CV syllables only while other Chinese dialects have many CVG or CVC syllables. Problematic data in Shanghai can be explained if we take into account the effects of rhythm, functional words and compounds on prosodic phrasing. Thus, we can explain the data in Shanghai which might have presented a problem in deriving the prosodic edge parameter from the syntactic head parameter. It is quite an advance, I believe, to be able to dispense with the edge parameter, which has been something of a problematic concept.

5. Conclusion

In this paper, I have argued that the edge parameter is not necessary for prosodic phrasing if we assume the bare mapping from syntactic structure onto phonology. The difference in syntactic structure can be determined by head parameter, i.e. head-initial or head-final. The phrasing in Shanghai Chinese, seemingly the problematic case for this analysis, is explained by its phonological properties such as syllable structure and Tone Deletion together with the constraint on deletion of important information expressed by nouns and verbs.

Thus we can dispense with the edge parameter. The remaining question is whether the head parameter can be derived by more basic elements. Kayne (1994) proposes the universal base hypothesis, which claims that all the languages have head-initial structure. The word order differences are due to the presence or absence of complement-movement. Tokizaki and Kuwana (2009) argue that complement-movement is possible if the language has leftward stress pattern. If this analysis is on the right track, what we need to explain the syntactic headedness and prosodic phrasing is the word stress canon in the language. I will leave this topic for a future study.

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