

## **A Prosodic Domain = A Spell-Out Domain?\***

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**ABSTRACT.** In this paper, I reconsider how prosodic domains are defined in the syntax-phonology mapping. Given the multiple spell-out theory of syntax-phonology interface, it has been suggested that a spell-out domain corresponds to one of the prosodic domains such as phonological phrase or intonational phrase. However, it is not clear why a spell-out domain needs to correspond to just one of the prosodic domains. I argue that prosodic domains should rather be recast as the primes of linearization processes that are indispensable in the syntax-phonology mapping.

**Keywords:** multiple spell-out, prosodic domains, syntax-phonology interface, linearization

### **1. Overview**

One of the research questions that I am concerned with here is whether a prosodic domain can really be characterized as a spell-out domain. In the past 15 years or so, the increasing number of researchers has claimed that a domain of spell-out corresponds to a prosodic domain on both empirical and theoretical grounds (e.g. Kratzer and Selkirk 2007). A closer look at these researches reveals, however, that such correspondence between spell-out and prosodic domains is rather arbitrary in the sense that will be clarified later in this paper. Moreover, the spell-out based approach seems to fail to provide a comprehensive architecture of the prosodic hierarchy containing more than one prosodic domain.

Elaborating on the theory of syntax-phonology mapping put forward in Dobashi (2013), I argue that prosodic domains should not be characterized as a domain of spell-out but that they should rather be identified as units of linearization procedures that relate syntax with phonology.

In section 2, I discuss some of the previous proposals concerning the correspondence between spell-out and prosodic domains, and point out that the correspondence is not determined on principled grounds. In section 3, I recapitulate some of the arguments presented in Dobashi (2013), and argue that the prosodic domains should be regarded as primes of linearization processes that apply in the mapping from syntax to phonology. In section 4, I consider how these linearization processes apply, discussing the distribution of discourse particles in Korean and Japanese. Section 5 concludes the paper.

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\* This paper is an extended and modified version of Dobashi (in press), which is written in Japanese.

## 2. Prosodic Domains and Multiple Spell-Out

In the study of prosodic phenomena, it has been observed that the domains of phonological rules that apply across word boundaries are hierarchically structured, forming the so-called Prosodic Hierarchy. Although various versions of the Prosodic Hierarchy have been suggested, the hierarchy usually consists of Utterance (Utt), Intonational Phrase (IntP), Phonological Phrase (PhP), and Prosodic Word (PrW) in the following manner (Halliday 1967, Selkirk 1978, Nespor and Vogel 1986):

(1)	<		>		
	[		]	[	]
	{	}	{	}	}
	(	)	(	)	)
					Utt IntP PhP PrW

Some argue that this hierarchy is constructed solely on the basis of phonetic facts (e.g. Jun 1998), and others argue that it is formed with recourse to syntactic information in the process of syntax-phonology mapping (Selkirk 1986, Nespor and Vogel 1986). The debate over these issues has not been settled yet, but I will adopt the latter view as a working hypothesis.

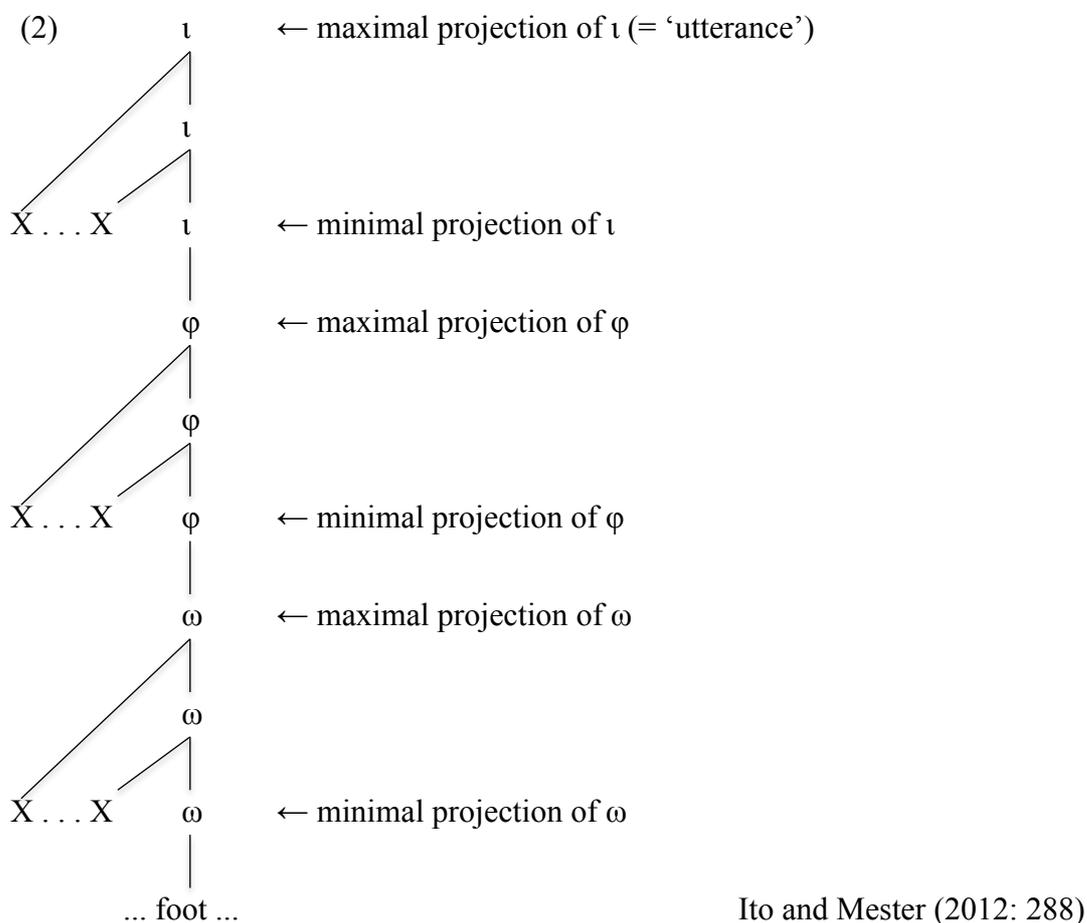
Before Uriagereka (1999) proposed the Multiple Spell-Out Theory, Nespor and Vogel's (1986) so-called Relation-based Theory and Selkirk's (1986) so-called End-based Theory had been the two major approaches to the syntax-phonology mapping. The Relation-based Theory is a rule-system that defines the domains of PrW, Clitic Group, PhP, IntP and Utt in terms of syntactic structural relations. Thus, roughly put, a PhP is defined as a domain containing a lexical head and function word(s) on its nonrecursive side, and an IntP is defined as a string of PhPs "that is not structurally attached to the sentence tree at the level of s-structure" (pg.189). The End-based Theory aligns a syntactic edge with a prosodic edge. Thus, the left/right edge of a maximal projection XP is aligned with the left/right edge of a PhP, and the left/right edge of a lexical head is aligned with the left/right edge of a PrW, and so on. This End-based Theory was later reformulated within the framework of the Generalized Alignment Theory (McCarthy and Prince 1993) and developed along with the Optimality Theory (see Truckenbrodt 1995, 1999).

When Uriagereka (1999) proposed the Multiple Spell-Out Theory, many researchers, including Uriagereka himself, started to suggest that a domain of Spell-Out corresponds to a prosodic domain. Especially after Chomsky (2000) proposed a phase-based theory of Multiple Spell-Out, the study of syntax-phonology relation has contributed to crystallization of the properties of syntactic cycle as well as the prosodic phenomena (e.g. Legate 2003).

Notice, however, that no principled account has been given of why a domain of Spell-Out corresponds to just one of the prosodic domains of the Prosodic Hierarchy. Some argues that a domain of Spell-Out corresponds to a PhP (Seidl 2001, Kratzer and Selkirk 2007, etc.) while others argue that it corresponds to an IntP (Shiobara 2010, Frascarelli 2000, etc.), but

they just assume so without any theoretical motivation. That is, the correspondence between spell-out and prosodic domains seems to be arbitrary. Furthermore, a Multiple Spell-Out-based theory does not say anything about the other prosodic domains, unlike the Relation-based Theory and the End-based Theory, which attempted to define all types of prosodic domains in a consistent and comprehensive way.

Another important issue, which the Multiple Spell-Out theory would raise, is that it does not offer any theoretical foundation as to how many prosodic domains we would need to postulate. Ito and Mester (2012) claim on empirical grounds that the Prosodic Hierarchy consists of exactly three prosodic categories (IntP, PhP, and PrW), and that the other categories in fact result from recursion of those categories (I will henceforth call this hypothesis the “Three-Layer Hypothesis”). Thus the prosodic category of Utterance is now considered to be a recursion of IntP:



They further argue that the Three-Layer Hypothesis receives a principled account under Selkirk’s (2009, 2011) Match Theory, which maintains that basic syntactic notions of clause, phrase and word “match” IntP, PhP and PrW, respectively:

(3) *Match Theory* (Selkirk 2009, 2011, Elfner 2012 cf. Selkirk 2005)

a. Match Clause

A clause in syntactic constituent structure must be matched by a constituent of a

corresponding prosodic type in phonological representation, call it  $\iota$ .

b. Match Phrase

A phrase in syntactic constituent structure must be matched by a constituent of a corresponding prosodic type in phonological representation, call it  $\varphi$ .

c. Match Word

A word in syntactic constituent structure must be matched by a constituent of a corresponding prosodic type in phonological representation, call it  $\omega$ .

It follows then that the three prosodic categories in the Three-Layer Hypothesis are syntactically grounded:

(4)	[		][		IntP		←	Clause
	{	}}	}}	}	PhP	←		Phrase
	(	)	)	)	PrW	←		Word

This hypothesis appears to be intuitively natural in that each prosodic category is rooted in the indispensable grammatical notions of clause, phrase and word. There are, however, some obscure points in this proposal. First, if this were correct, Multiple Spell-Out will be totally irrelevant to prosodic phrasing. However, Selkirk (2009), adopting the Match Theory, also appeals to Multiple Spell-Out to account for some phrasing facts. It is not clear if Spell-Out plays a role in the prosodic domain formation. Second, it is also not clear how to syntactically distinguish clauses, phrases and words in the process of syntax-phonology mapping. Thus, CP and vP would be a clause and a phrase, respectively, and they should be distinguished in some way or other. But they are both XP-level syntactic objects (or phases, in current syntactic terms), and there seems to be no way to distinguish them formally. In the study of syntax-phonology interface, it has been generally held that the reference to syntactic information should be restricted to a minimum (Inkelas and Zec 1995: 536-537), and the syntactic information available to prosodic domain formation has been restricted to the distinction between content and function words and their projections (Truckenbrodt 1999). In order to distinguish CP from vP, it would be necessary to gain access to additional syntactic information. Third, the Match Theory postulates that a clause corresponds to an IntP, but there are cases where non-clausal constituents form an IntP. The following examples are cited from Nespor and Vogel (1986: 188):

- (5) a. Lions [as you know] are dangerous.  
 b. My brother [who absolutely loves animals] just bought himself an exotic tropical bird.  
 c. That's Theodore's cat [isn't it?]  
 d. [Clarence] I'd like you to meet Mr. Smith.  
 e. [Good heavens] there's a bear in the back yard.

f. They are so cute [those Australian koalas].

The bracketed parts are IntPs. Clearly, the bracketed parts in (5c-f) are not clauses. Nespor and Vogel argue that these elements are similar in that they are not part of the root sentences, and that they are “not structurally attached to the sentence tree.” This seems to be correct, but the Match Theory would not be able to capture this natural descriptive observation.

So far, I have argued that it is difficult to maintain the assumption that a Spell-Out domain corresponds to a prosodic domain since it is an arbitrary correspondence and it does not have any theoretical motivation. In the next section, I show that the linearization-based approach to the prosodic domain formation could give a principled and comprehensive account of the Prosodic Hierarchy

### 3. Linearization and Prosodic Domains

This section recapitulates some of the arguments offered by Dobashi (2013). Linearization of the syntactic terminal elements has been assumed to apply in the process of syntax-phonology mapping in the theory of grammar that adopts a version of the Bare Phrase Structure theory since linear order is not defined within the syntactic component while words should be linearly ordered within the phonological component. That is, linearization is one of the essential and indispensable operations in the syntax-phonology mapping. Then, it would be natural, in a sense, to assume that Spell-Out, which transfers unordered syntactic objects to the phonological component, serves to linearize syntactic objects.

Given these theoretical backgrounds, let us consider how linearization works. In this study, I assume (i) that the sister of a phase head undergoes Spell-Out (Chomsky 2000), and (ii) that linear order is defined in terms of asymmetric c-command relation (Kayne 1994). Suppose that WP and YP are phases in the following schematic syntactic object:

(6)  $[_{WP} a W [_{XP} b X [_{YP} c Y [_{ZP} d Z e ]]$

In the bottom-up derivation, the sister of Y, i.e. ZP, is spelled-out first, and the following linear order is defined among d, Z and e. Let us call this string P:

(7)  $P = \langle d, Z, e \rangle$

Then, as the derivation goes on, the sister of W, i.e. XP, is spelled-out, and the following linear order is obtained. Let us call this string Q:

(8)  $Q = \langle b, X, c, Y \rangle$

Lastly, the root undergoes Spell-Out, and we have the following string, which we call R:

(9)  $R = \langle a, W \rangle$

At this point, the linear order within each string has been determined. However, as I pointed out elsewhere (Dobashi 2003, 2009), the linear order among P, Q and R has not been

determined yet. Thus, not only (10a) but also (10b) and (10c) would be equally possible although the expected order is (10a):

- (10) a. <<a, W>, <b, X, c, Y>, <d, Z, e>>  
 b. <<d, Z, e>, <b, X, c, Y>, <a, W>>  
 c. <<b, X, c, Y>, <d, Z, e>, <a, W>>

That is, we need to define the linear order among the strings created by Multiple Spell-Out in addition to that among terminal elements within the domain of each Spell-Out. It is suggested in Dobashi (2003) that the linear order among the strings created by Multiple Spell-Out is also determined on the basis of asymmetric c-command. Thus R precedes both Q and P because both a and W asymmetrically c-command all the terminal elements within Q and P, and Q precedes P likewise.

As pointed out in section 2, the previous studies within the Multiple Spell-Out theory did not give a principled account for why a domain of Spell-Out corresponds to a certain prosodic domain. However, it seems that the assumption that a domain of Spell-Out corresponds to a PhP is more or less on the right track on empirical grounds, especially in the phase-based approach where CP and vP are assumed to be phases (see Fuß 2008, Ishihara 2003, Kahnemuyipour 2004, Kratzer and Selkirk 2007, Sato 2009, Seidl 2001, among others). Moreover, the terminal elements of syntactic structure usually correspond to PrWs, as is clear from the formulation of the Relation-based Theory, the End-based Theory, and the Match Theory. It is important here to notice that PhP and PrW both serve as primes of linearization: the former is a prime of the linearization of Spell-Out domain, and the latter a prime of the linearization of terminal elements. Therefore, I suggest the following:

- (11) a. A prime of  $\text{Lin}(W) = \text{PrW}$   
 b. A prime of  $\text{Lin}(S-O) = \text{PhP}$

Here  $\text{Lin}(W)$  and  $\text{Lin}(S-O)$  stand for the linearization of terminal elements (or words) and that of Spell-Out domains, respectively. Given this formulation, the assumption of “a Spell-Out domain = PhP” is no longer arbitrary, and it rather follows from the linearization process that is indispensable to the syntax-phonology mapping. That is, (11a) and (11b) can be regarded as null hypotheses, requiring no extra device that is specifically designed for the formation of these two prosodic categories.

So far, we have seen that two of the three layers of the Three-Layer Hypothesis are reducible to the primes of linearization. Let us now consider IntP from the perspective of linearization. Lambrecht (1994) points out that linearization can be classified into two types: One concerns syntax, and the other pragmatics/information structure. It should be noticed that the linearization in terms of information structure results in free word order in many languages, and importantly, these freely ordered elements constitute IntPs. For example, in

Italian, a topic phrase usually shows comma intonation, constituting an IntP:

- (12) a. A Carlo, sul tavolo, quel libro, non glielo lascio.  
 to Carlo on-the table that book not to.him-it leave-1sg.  
 ‘I won’t leave that book on the table for Carlo.’  
 b. Sul tavolo, quel libro, a Carlo, non glielo lascio.  
 c. Quel libro, sul tavolo, a Carlo, non glielo lascio.  
*etc.* (Frascarelli 2000: 160)

Similarly, in Chichewa, a topic phrase corresponds to an IntP, as pointed out by Kanerva (1990: 147):

- (13) a. SVO: Njûchi zi-ná-wá-lum-a alenje  
 bees SM-Past-OM-bite-Indic hunters  
 b. VOS: Zináwáluma alenje njûchi  
 c. OVS: Alenje zináwáluma njûchi  
 d. VSO: Zináwáluma njûchi alenje  
 e. SOV: Njûchi alenje zináwáluma  
 f. OSV: Alenje njûchi zináwáluma (Bresnan and Mchombo (1987: 744-745))

Given that the word order is free in these constructions, it would be reasonable to assume that the linearization involved here is non-syntactic and determined on the basis of information structure.

Other non-syntactic factors relevant to linearization include prosodic weight. Let us consider the Heavy NP Shift in English:

- (14) A: What happened yesterday?  
 B: [Kay donated to the library][five hundred Canadian dollars and her collection  
 of novels by Mishima] (Shiobara 2010: 89)

Shiobara (2010) shows that the shifted NP should be heavy enough prosodically, and that it corresponds to an IntP.

Furthermore, Sproat and Shih (1991) observe that the unmarked word order among adjectives modifying a noun is QUALITY > COLOR > PROVENANCE, and the sentence is pronounced suitably without comma intonation in this order as in (15a), while the order gets free with comma intonation, which indicates an IntP, as in (15b):

- (15) a. She loves all those wonderful orange Oriental ivories.  
 b. She loves all those Oriental, orange, wonderful ivories.  
 (Sproat and Shih 1991: 578)

Sproat and Shih suggest that the adjectives in (15b) modify the head noun in parallel:



and then they are grouped together into PhPs, which in turn are joined together into IntPs:

(18) Syntax → PrW → PhP → IntP → Sensorymotor System

Although conceptual arguments go either way, I suppose that the computational system of human language is more or less uniform in the sense that the morphosyntactic component and the phonological component make similar use of basic structure-building operations. Since I adopt the basic framework of the minimalist program for syntactic theorizing where the basic operation Merge concatenates syntactic objects into a larger syntactic object, I assume that prosodic objects are also formed by combining smaller prosodic objects in a bottom-up fashion, a difference being that syntactic Merge operation is binary while the prosodic concatenation is not necessarily binary.

In order to show that we have a step-by-step derivational process in the formation of the Prosodic Hierarchy as in (18), let us consider the distribution of discourse particles in Korean and Japanese. The discussion here is based on Yim and Dobashi (2015, to appear). Korean and Japanese have sentence-medial discourse particles (*-yo/-ne*) that are attached to phrases rather freely:

- (19) a. Celin-i(-yo) ecey(-yo) kkaphey-eyse(-yo) Kim-ul(-yo) mannasseyo.  
 Celin-Nom(-yo) yesterday(-yo) café-at(-yo) Kim-Acc(-yo) met.C-*yo*  
 ‘Celin met Kim at the café yesterday.’ [Korean]
- b. Taro-ga(-ne) kinoo(-ne) kafe-de(-ne) Taro-o(-ne) mita-yo.  
 Taro-Nom(-ne) yesterday(-ne) café-at(-ne) Taro-Acc(-ne) saw-*yo*  
 ‘Taro saw Jiro at the café yesterday.’ [Japanese]

Yim and Dobashi show that *-yo* in Korean targets the right edge of a PhP while *-ne* in Japanese targets the right edge of a PrW. Thus, *-yo* in Korean cannot attach to a genitive NP which constitutes a PhP with the following NP, while *-ne* in Japanese can attach to a genitive NP:

- (20) a. Yeona-uy(\*-yo) kacengkyosa-ka(-yo) Mina-lul cohahay-yo  
 Yeona-gen(-yo) tutor-nom(-yo) Mina-acc like-*yo*  
 ‘Yeona’s tutor likes Mina.’ (cf. Jun 2011) [Korean]
- b. Yuna-no(-ne) kateekyooshi-ga(-ne) Mina-o aishiteiru-yo  
 Yuna-gen(-ne) tutor-nom(-ne) Mina-acc love-*yo*  
 ‘Yuna’s tutor loves Mina.’ [Japanese]

Likewise, *-yo* in Korean cannot target a preverbal manner adverb, which constitutes a PhP with the verb, while *-ne* in Japanese can target such an adverb:

- (21) a. Ikes-ul tangcang(\*-yo) chelihasey-yo.  
 this-acc immediately(\*-yo) handle.C-*yo*

- ‘Have this done immediately.’ [Korean]
- b. Kore-o sugu(-ne) yar-inasai-yo.  
 this-acc immediately(-ne) do-imperative-yo
- ‘Have this done immediately.’ [Japanese]

However, Yim and Dobashi observe that once these particles are attached, the phrases that host them are realized as IntPs, having a significant pause right after them. Thus, we have a dilemma: while *-yo* and *-ne* appear to target a PhP and a PrW, respectively, they are realized as IntPs. To solve this dilemma, they propose to adopt the architecture shown in (18), and argue that these particles are first attached to PhP/PrW during the course of syntax-phonology mapping, and then they are later realized as an IntP when IntP is created.

Moreover, it should be noted that, if this analysis is correct, we need to assume that we have abstract prosodic domains that are not manifested superficially. We need to assume, for example, that Korean has an abstract PhP hosting *-yo*, which is actually realized as an IntP. That is, PhP should be defined not solely in terms of surface phonetic facts (contra Jun 1998) but in terms of the syntax-phonology mapping process as we have discussed so far.

## 5. Conclusion

In this paper, I have shown that the prosodic domains need to be defined through the linearization procedure that applies in the mapping from syntax to phonology. I have shown that the three linearization procedures are needed, i.e. Lin(W), Lin(S-O) and Lin(−S), and the primes of these linearization procedures correspond to PrW, PhP and IntP. I have further argued that the formation of these prosodic domains should be applied in a bottom-up derivational fashion.

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