

# PHONOLOGICAL PHRASING AND SYNTACTIC DERIVATION

Yoshihito Dobashi, Ph.D.

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In this thesis, I propose a theory of syntax-phonology mapping within the framework of the Minimalist Program incorporating Multiple Spell-Out and Label-free phrase structure (Chomsky 2001a, b, Collins 2001, Uriagereka 1999). I claim that a phonological string mapped to the phonological component by Spell-Out corresponds to a phonological phrase.

In Chapter 1, I propose a theory of Linearization within the framework of the Multiple Spell-Out and Label-free theories. I argue that the initial element in the domain of Spell-Out should escape the mapping to the phonological component in order to establish a linear order between the two units of Spell-Out. Under the proposed theory of Linearization, I claim that the string that is mapped to the phonological component corresponds to a phonological phrase.

In Chapter 2, I examine some cross-linguistic variation in phonological phrasing within the proposed theory. I argue that the prosodic condition that a phonological phrase contain two or more phonological words triggers restructuring of phonological phrases (Inkelas and Zec 1995). I propose that the prosodic condition be parameterized, and that the direction of the restructuring be parameterized.

In Chapter 3, I examine phonological phrasing in the Japanese DP. I claim that the derivational approach to syntax plays a crucial role in syntax-phonology mapping, by showing that restructuring should apply each time a phonological string is mapped to the phonological component.

In Chapter 4, I examine focus and its effect on phonological phrasing in KiYaka and Sandawe. I propose that the IP-external FocP is a strong phase (Frascarelli 2000, Rizzi 1997). I show the theory of syntax-phonology mapping proposed in Chapter 1 accounts for the phonological phrasing in these languages.

In Chapter 5, I attempt to construct a strictly derivational theory of phonological phrasing, by suggesting that the phonological phrase be eliminated.

In Chapter 6, I conclude the discussion.

## BIBLIOGRAPHICAL SKETCH

Yoshihito Dobashi earned an undergraduate degree in English linguistics from Tohoku University in 1996, and a master's degree in English linguistics from Tohoku University in 1998. He joined the Field of Linguistics of the Graduate School of Cornell University in the same year.

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## ABBREVIATIONS

Acc	Accusative Case	Pres	Present tense
Asp	Aspect	PP	Past Participle
ADV	Adverb	Prt	Particle
AUX	Auxiliary	ϕ	Phonological phrase
Fem	Feminine	Φ	Phonological component
Foc	Focus	Rel	Relative marker
Fut	Future	Sg	Singular
Gen	Genitive Case	Subjn	Subjunctive
Ind	Indicative	SM	Subject Marker (Bantu)
ip	immediate past (KiYaka)	Top	Topic
Nom	Nominative Case	T	Tense
OCC	Occurrence	1, 2, 3	first, second, third person
OM	Object Marker (Bantu)		
Past	Past tense		
Pl	Plural		

**CHAPTER ONE**  
**MULTIPLE SPELL-OUT AND PHONOLOGICAL PHRASING**

**1. Introduction**

In this thesis, I propose a theory of syntax-phonology mapping within the framework of the Minimalist Program (Chomsky 2001a, b). I argue for a derivational theory of syntax by showing that phonological phrasing reflects the syntactic cycle.

Specifically, I propose that a phonological string mapped to the phonological component by Spell-Out corresponds to a phonological phrase within a label-free theory of phrase structure and Multiple Spell-Out theory (Chomsky 2001a, b. Collins 2001a, b. Uriagereka 1999). Under this proposal, the computation in the phonological component is performed as the syntactic derivation goes on, and therefore there is no phonological cycle independent of the syntactic one (Chomsky 2001b: 4). The proposed theory is the null hypothesis in the sense that it requires no particular mapping algorithm that creates a phonological phrase by referring to syntactic information such as maximal projections (cf. Nespor and Vogel's (1986) Relation-based theory and Selkirk's (1986, 1995) Edge-based theory). It is important to notice that it is quite difficult to construct such a theory within a representational theory of syntax since the mapping algorithm cannot divide the phonological string corresponding to the entire syntactic representation into multiple phonological strings without reference to any syntactic information or without violating the inclusiveness condition (Chomsky 1995b: 228).

Therefore, the proposed theory of phonological phrasing lends a conceptual support for the derivational approach to syntax.

This thesis is organized as follows: In this chapter (Chapter 1), I propose a theory of phonological phrasing. In Chapter 2, I show that the proposed theory provides an account for a wide range of the data. In particular, I show that the restructuring of the phonological phrasing can be applied for purely phonological reasons, without reference to syntactic information. In Chapter 3, I give an analysis of the phonological phrasing in Japanese DPs, and show that the cyclic mapping to the phonological component is crucial to account for the data, supporting the derivational approach to syntax. In Chapter 4, I give an analysis of focus and its effects on phonological phrasing in KiYaka and Sandawe within the proposed framework. In Chapter 5, I speculate about some further possible simplifications of the theory of syntax-phonology by suggesting that phonological phrases be eliminated. In Chapter 6, I conclude the discussion.

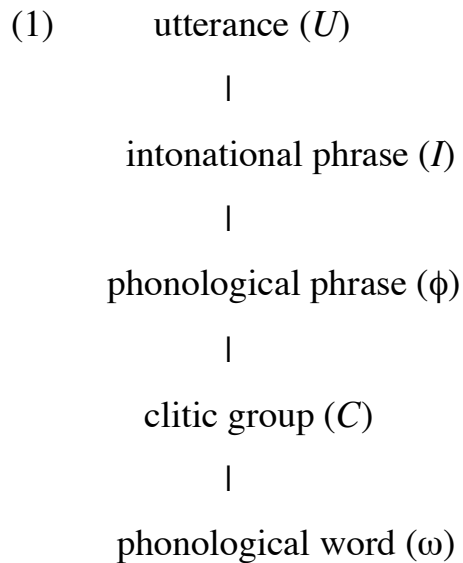
This chapter is organized as follows: In section 2, I introduce the background assumptions on syntax-phonology mapping and review the current major theories of phonological phrasing. In section 3, I introduce the label-free theory of phrase structure of Collins (2001a) and point out that the current theories of phonological phrasing are incompatible with the label-free theory. In section 4, I propose a theory of Linearization within the framework of label-free theory. In section 5, I introduce the Multiple Spell-Out theory (Chomsky 2001a, b). I propose that the interaction between the proposed theory of Linearization and Multiple Spell-Out theory defines a phonological phrasing.

## 2 Previous Theories

In this section, I discuss two major theories of phonological phrasing, Relation-based theory (Nespor and Vogel 1986) and Edge-based theory (also called End-based theory. Chen 1987, Selkirk 1986). See Inkelas and Zec 1995 for the review of these theories.<sup>1</sup>

### 2.1 Background

It is generally assumed that prosodic structure consists of the prosodic constituents, which are hierarchically ordered as shown in (1) (Selkirk 1984, Nespor and Vogel 1986, Hayes 1989):<sup>2</sup>



Of these, the phonological phrase (or *p-phrase*,  $\phi$ ) is the prosodic category that is defined by the syntax-phonology mapping.<sup>3</sup>

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<sup>1</sup> For much earlier approaches to syntax-phonology mapping, see Clements 1977, Chomsky and Halle 1968, Selkirk 1972, among others.

<sup>2</sup> See Zec and Inkelas 1991 for the discussion about Clitic Group.

Schematically, the prosodic hierarchy in (1) is organized in the following manner:

$$\begin{aligned}
 (2) \quad & ( \quad )_U \\
 & ( \quad )_I ( \quad )_I \\
 & ( \quad )_\phi ( \quad )_\phi ( \quad )_\phi ( \quad )_\phi \\
 & (\omega \omega)_C (\omega)_C (\omega)_C (\omega \omega)_C (\omega)_C (\omega)_C (\omega)_C
 \end{aligned}$$

In the prosodic structure, each constituent is properly contained in the next higher prosodic constituent (*Strict Layer Hypothesis*, Selkirk 1984, Nespor and Vogel 1986, Hayes 1989).<sup>4</sup> Thus in (2) a phonological word  $\omega$  is properly contained in the next higher prosodic category clitic group  $C$ , and the  $C$  is properly contained in the next higher prosodic category p-phrase  $\phi$ , and so forth. Given this hypothesis, prosodic structure is always non-recursive in that it does not allow the recursion of the same prosodic level. Thus, the following phonological phrasing is disallowed:<sup>5</sup>

$$(3) \quad * (( \quad )_\phi ( \quad )_\phi)_\phi$$

Strict Layer Hypothesis also implies that all the prosodic constituents must be exhaustively contained in the next higher prosodic category. Thus, the following phonological phrasing is disallowed:

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<sup>3</sup> See Selkirk 1986, 1995, Truckenbrodt 1999:221 for details.

<sup>4</sup> For recent studies under Strict Layer Hypothesis, see Frascarelli 2000, Frota 2000, Selkirk 1995 among many others including papers cited in Chapter 2.

<sup>5</sup> Cf. Truckenbrodt 1995, 1999 for recursive phonological phrasing.

(4) \* ( ( (ω)<sub>C</sub> ((ω)<sub>C</sub>)<sub>φ</sub> ( (ω)<sub>C</sub> (ω)<sub>C</sub> )<sub>I</sub> )<sub>U</sub>

Here, the left most clitic group is not contained in a p-phrase.

In the next two sections, I will discuss the two major theories of syntax-phonology mapping which are formulated under Strict Layer Hypothesis: Relation-based Theory and Edge-based Theory.

## 2.2 Relation-based Theory

Under Strict Layer Hypothesis, Nespors and Vogel (1986) propose the following Relation-based theory of syntax-phonology mapping:

(5) Phonological Phrase Formation (Nespors and Vogel 1986: 168)

a. *φ domain*

The domain of φ consists of a C which contains a lexical head (X) and all Cs on its nonrecursive side up to the C that contains another head outside of the maximal projection of X.

b. *φ construction*

Join into an n-ary branching φ all Cs included in a string delimited by the definition of the domain of φ.

Here φ is a p-phrase and C is a clitic group. Under these formulations, let us consider the following syntactic structure:

(6)  $[_{IP} \text{ NP}_{\text{Subj}} \text{ Infl } [_{VP} \text{ V } \text{ NP}_{\text{Obj}} ]]$

Here, Subj occupies Spec of Infl, and Obj occupies the complement of the verb V. Suppose that Subj, Infl, V and Obj all correspond to Cs. First, we locate lexical heads. In (6), there are three lexical heads: The head of  $\text{NP}_{\text{Subj}}$ , V, and the head of  $\text{NP}_{\text{Obj}}$ . Since (6) is head initial, the non-recursive side is the left side. Thus,  $\text{NP}_{\text{Subj}}$  and  $\text{NP}_{\text{Obj}}$  correspond to their own p-phrases. V is phrased with Infl since Infl is on the non-recursive side of V and is a non-lexical category. Note that  $\text{NP}_{\text{Subj}}$  is not phrased with V even though it is on the non-recursive side of V since it is a C which has a lexical category N as a head. Based on these, (5b) maps (6) to the following p-phrases:

(7)  $(\text{NP}_{\text{Subj}})_{\phi} (\text{Infl } \text{ V } )_{\phi} (\text{NP}_{\text{Obj}})_{\phi}$

Nespor and Vogel (1986) also propose the following optional rule.

(8)  *$\phi$  restructuring* (optional) (Nespor and Vogel 1986: 173)

A nonbranching  $\phi$  which is the first complement of X on its recursive side is joined into the  $\phi$  that contains X.

Thus, in (7),  $(\text{NP}_{\text{Obj}})_{\phi}$  may be restructured into the preceding p-phrase if it is non-branching since it is the first complement of V on its recursive side:

(9)  $(\text{NP}_{\text{Subj}})_{\phi} (\text{Infl } \text{ V } \text{ NP}_{\text{Obj}})_{\phi}$

Note that  $(NP_{\text{Subj}})_\phi$  may not restructure into the following p-phrase even if it is non-branching because it is not a complement of Infl or V, nor on the recursive side of Infl or V.

### 2.3 Edge-based Theory

Following Chen (1987), Selkirk (1986) proposes the Edge-based theory of syntax-phonology mapping (See also Selkirk 1995:444 and Truckenbrodt 1995, 1999 for the formulation of this theory within the framework of *Generalized Alignment* (McCarthy and Prince 1993)). In this theory, the right or left edge of a syntactic category is mapped to the right or left edge of a prosodic category. The following formulation is adopted from Truckenbrodt (1999: 223), where  $\phi$  is a p-phrase and XP is a maximal projection of a lexical category:

(10) a. Align-XP, R: Align (XP, R;  $\phi$ , R)

“For each XP there is a  $\phi$  such that the right edge of XP coincides with the right edge of  $\phi$ .”

b. Align-XP, L: Align (XP, L;  $\phi$ , L)

“For each XP there is a  $\phi$  such that the left edge of XP coincides with the left edge of  $\phi$ .”

Depending on the language, one of these two alignment constraints is chosen. Thus Align-XP, R is chosen in Kimatuumbi (Cowper and Rice



1987, cf. Odden 1987, 1990, 1996), and Align-XP, L is chosen in Japanese (Selkirk and Tateishi 1991, Nagahara 1994).<sup>6</sup>

Consider the following syntactic structure:

$$(11) \quad [_{IP} \text{ NP}_{\text{Subj}} \quad \text{Infl} [_{VP} \text{ V} \quad \text{NP}_{\text{Obj}} ] ] ]$$

Here, we have three maximal projections of lexical categories:  $\text{NP}_{\text{Subj}}$ ,  $\text{VP}$  and  $\text{NP}_{\text{Obj}}$ . Suppose that Align-XP, R is chosen in this language.<sup>7</sup> The right edges of these categories are mapped to the right edges of phonological phrases. Thus, the right edge of  $\text{NP}_{\text{Subj}}$  corresponds to the right edge of a p-phrase, and the right edge of  $\text{VP}$ , as well as that of  $\text{NP}_{\text{Obj}}$ , corresponds to the right edge of a p-phrase:

$$(12) \quad (\text{NP}_{\text{Subj}})_{\phi} \quad (\text{Infl} \quad \text{V} \quad \text{NP}_{\text{Obj}})_{\phi}$$

## 2.4 Summary

So far, we have seen how Relation-based theory and Edge-based theory work. The predictions made by these theories are reproduced below:

$$(13) \quad \begin{array}{l} \text{a. } (\text{NP}_{\text{Subj}})_{\phi} \quad (\text{Infl} \quad \text{V})_{\phi} \quad (\text{NP}_{\text{Obj}})_{\phi} \\ \text{b. } (\text{NP}_{\text{Subj}})_{\phi} \quad (\text{Infl} \quad \text{V} \quad \text{NP}_{\text{Obj}})_{\phi} \end{array}$$

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<sup>6</sup> In the Optimality Theoretic approach, the constraints are universal and the parametric variation is captured by the constraint ranking. For example, Align-XP, L is ranked higher than Align-XP, R in Japanese. See Truckenbrodt 1999:228.

Relation-based theory predicts (13a) and optionally (13b), while Edge-based theory predicts (13b) with Align-XP, R (see Cowper and Rice 1987, Bickmore 1990 for discussion of branching category within the framework of Edge-based theory). Notice that even though the two theories have different predictions concerning the phrasing of the object, both of them predict that the subject is phrased alone. Putting aside whether NP<sub>Obj</sub> is phrased alone or not, these predictions hold true cross-linguistically, as shown by the large literature on syntax-phonology interface (See Chapter 2).

In the next section, I will point out a theory-internal problem with those theories which arises within the restricted theory of phrase structure in the Minimalist Program.

### **3. Label-free Phrase Structure and Syntax-Phonology Mapping**

In this section, I propose a theory of syntax-phonology mapping. First I introduce the label-free syntax of Collins (2001a) and point out a theory-internal problem with Relation-based and Edge-based theories of phonological phrasing. Second, I introduce a theory of Multiple Spell-Out within the framework of Chomsky (2001a,b) where Spell-Out applies to the sister of a strong phase head. I point out that the unit of Multiple Spell-Out does not correspond to a desired p-phrase. Third, I propose a theory of Linearization which does not refer to projections. Fourth, I

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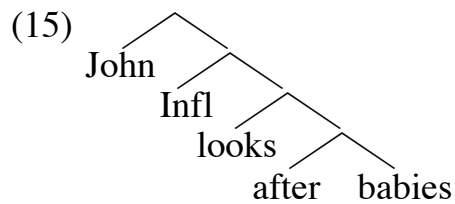
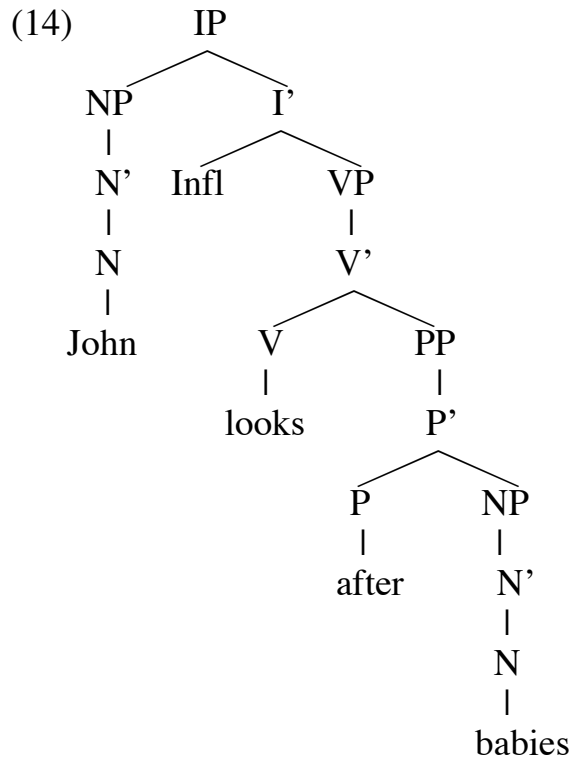
<sup>7</sup> I will not discuss Align-XP, L here because it tends to be chosen in SOV languages (Japanese (Selkirk and Tateishi 1991, Nagahara 1994), Sandawe (Elderkin 1989, Dobashi 2002), etc.).

suggest that the interaction between Multiple Spell-Out and the proposed theory of Linearization yields the desired theory of phonological phrasing.

### **3.1 A Problem with the Previous Theories**

Within the framework of Bare Phrase Structure theory (Chomsky 1995a, and subsequent work), phrase structure is constructed derivationally through the application of the structure-building operation Merge, which applies to lexical items that are taken from the Lexicon. As a result, the phrase structure consists of only lexical items. That is, features that are not intrinsic to the lexical items may not appear in the phrase structure. Accordingly, phrasal notions such as “maximal projections” or “bar levels” are not primitive notions, unlike in X-bar theory (Chomsky 1970, Jackendoff 1977), rather, they are derivative notions defined on the representation.

Collins (2001a) argues that labels and projections should be eliminated from the phrase structure of syntax (See also Chomsky 2001b). Thus, the traditional X-bar schematic phrase structure shown in (14) should take the form of (15):



In the label-free theory, the phrasal notations like IP, VP, V', V are reduced to the properties of the derivation and the syntactic relations that hold among lexical items. Under this restrictive theory of phrase structure, it is impossible to formulate a theory of grammar that refers to the labels and projections. Thus, in (15), we cannot say that V selects PP; rather, we say *look* selects *after*, for instance (See Collins 2001a for detailed discussion).

Given this, let us consider the formulation of the Relation-based theory and the Edge-based theory of syntax-phonology mapping, repeated here:

(16) *Relation-based Theory*:

$\phi$  domain (Nespor and Vogel 1986: 168)

The domain of  $\phi$  consists of a  $C$  which contains a lexical head ( $X$ ) and all  $C$ s on its nonrecursive side up to the  $C$  that contains another head outside of the maximal projection of  $X$ .

(17) *Edge-based Theory*

Align-XP, R: Align (XP, R;  $\phi$ , R)

“For each XP there is a  $\phi$  such that the right edge of XP coincides with the right edge of  $\phi$ .”

Both theories make a crucial reference to projections of phrase structure by referring to a maximal projection. These theories are successful in that they provide very accurate descriptive devices, but they are theoretically undesirable in that they refer to projections.

In the next section, I discuss a theory of syntax-phonology mapping within the framework of the Multiple Spell-Out theory.

### 3.2 Multiple Spell-Out

Within the framework of the Minimalist Program (Chomsky 2001b: 3-6), the operation Spell-Out relates syntax with phonology. Lexical items with phonological, semantic, and syntactic features are taken out of the Lexicon, and undergo a structure-building operation Merge creating a phrase structure cyclically in the component of narrow syntax NS. At some point, an operation TRANSFER sends the derivation of narrow syntax  $D_{NS}$  to the phonological component  $\Phi$  and the semantic component  $\Sigma$ , generating a pair <PHON, SEM>. PHON and SEM are accessed by

sensorimotor SM system and conceptual-intentional C-I system, respectively. The operation that sends  $D_{NS}$  to  $\Phi$  is called *Spell-Out*. Specifically, Spell-Out strips away the phonological features of the lexical items, and sends them to the phonological component  $\Phi$ , generating PHON. Since PHON is accessed by the SM system, it has to be legible to it.

Collins (2001a: section 4) suggests that in a label-free theory of syntax, phonological phrasing should be accounted for in terms of Multiple Spell-Out (Chomsky 2000, 2001a.b. Uriagereka 1999). More precisely, he suggests that the phonological string that corresponds to the unit of Spell-Out be marked as a potential phonological phrase. In this way, the phonological phrasing can be defined without recourse to maximal projections as long as Spell-Out does not refer to them. Also, it is desirable to assume that Spell-Out defines a phonological phrase since it is the only operation that connects syntax and phonology. The introduction of any other mechanism would be a departure from the null hypothesis.

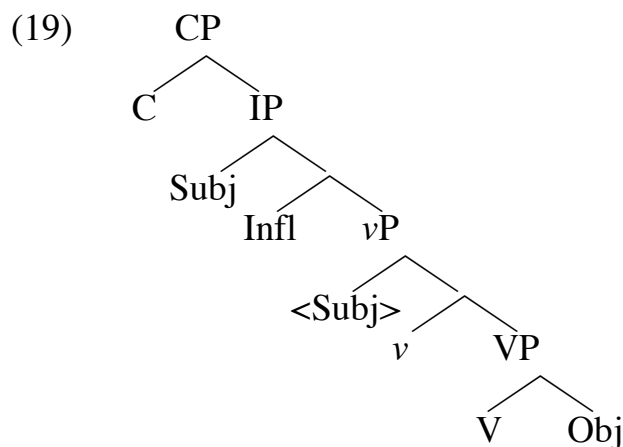
In Multiple Spell-Out theory of Chomsky (2001a.b), Spell-Out applies to the sister of a strong phase head. It is assumed that “vP” and “CP” are phases.

(18) The sister of a strong phase head is Spelled-Out.

Note that in (18) I refer to a particular “head,” but it is used as an absolute notion in that it refers to a lexical item without any reference to labels or projections. Note also that here and below, I use notations like

“vP” or “CP” to refer to some specific constituent in a phrase structure just for convenience, and they do not confirm the existence of labels and projections. Thus, “vP” or “CP” should be taken to be a constituent that is saturated at a certain point of derivation (see Collins 2001a). Given these, Spell-Out can be defined without a reference to maximal projections.

Now consider the phrase structure shown in (19):<sup>8</sup>



Here, *v* is responsible for theta-role assignment of Subj and Case-checking of Obj (Chomsky 1995b), and Subj moves to the Spec of Infl to check an OCC feature of Infl.<sup>9</sup> Under (18), the sisters of *v* and C, i.e., VP and CP undergo Spell-Out.

<sup>8</sup> Since there are no traces in the Minimalist Program, I use the notation “<X>” to represent the lower occurrence(s) of X (see Rizzi 2001:90). Roughly, <X> corresponds to a trace in the so-called GB theory.

<sup>9</sup> OCC stands for “occurrence.” It is sometimes called EPP. Originally, EPP or Extended Projection Principle is a requirement that clauses have subjects (Chomsky 1982: 10). However, I use the term OCC in a broader sense than EPP, in that it refers to a formal feature that requires a phrase to be merged in its local position, i.e., its specifier. The term EPP is not adequate in the Minimalist Program since the Projection Principle was

In the Minimalist Program, the phrase structure is built by Merge in a bottom-up fashion, and Spell-Out applies as the derivation goes on. Thus, the structure in (19) is constructed as follows:

- (20) a. V and Obj are Merged, creating  $[_{VP} V Obj]$   
 b.  $v$  is merged with the VP, creating  $[_{vP} v [_{VP} V Obj]]$   
 c. Subj is merged with  $vP$ , creating  $[_{vP} Subj v [_{VP} V Obj]]$   
 d. The sister of  $v$  is spelled-out.  
 e. Infl is merged with  $vP$ , creating  $[_{IP} Infl [_{vP} Subj v [_{VP} V Obj]]]$   
 f. Subj is (internally) merged with IP,  
     creating  $[_{IP} Subj Infl [_{vP} <Subj> v [_{VP} V Obj]]]$   
 g. C is merged with IP,  
     creating  $[_{CP} C [_{IP} Subj Infl [_{vP} <Subj> v [_{VP} V Obj]]]$   
 h. The sister of C is spelled-out.

First, the verb and the object are merged as in (20a). Then  $v$  is merged with the VP that was created at the previous step of the derivation, and we get a constituent  $vP$ , as in (20b), and the subject is merged with the  $vP$  created at the previous step of the derivation, as in (20c). At this point of the derivation, the sister of  $v$  is spelled-out.<sup>10</sup> Then, Infl is merged with

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abandoned (Chomsky 1995: 3.3). Also, the term OCC is more adequate in the copy theory of movement generally adopted in the Minimalist Program since its original use is to distinguish two or more occurrences of the same symbol (Chomsky 1975: 109-111). Thus, it can be used to distinguish two or more occurrences of a category or copy in the copy theory of movement (Chomsky 2000: 114-115).

<sup>10</sup> See Chomsky (2001a, b), Hiraiwa (2002) Nissenbaum (2000) for some proposals about the timing of Spell-Out.



the  $\nu$ P as in (20e), and the subject is internally merged with the IP created at the previous step of the derivation and checks the OCC feature of Infl, as in (20f). Then C is merged with the IP as in (20g), and the sister of C is spelled-out, as in (20h).

I assume that Spell-Out defines a linear order among lexical items when it sends  $D_{NS}$  to  $\Phi$ . In  $\Phi$ , a phonological string X is obtained for a unit of Spell-Out. Then it is reasonable to assume that this phonological string X corresponds to some local domain in  $\Phi$  where post-lexical phonological rules apply. I assume that such a domain is a p-phrase. Under the Strict Layer Hypothesis, the phonological strings created by Spell-Out should be mapped to a flat representation where there is no hierarchical relation among p-phrases. Then the following phonological phrasing is predicted:

$$(21) (C)_{\phi} ( \text{Subj} \quad \text{Infl} \quad \nu)_{\phi} ( V \quad \text{Obj})_{\phi}$$

Here, V and Obj are phrased together, Subj, Infl and  $\nu$  are phrased together, and C is phrased alone. Note that it is generally assumed in the literature (e.g. Chomsky 1995b) that V raises to  $\nu$ . Then the prediction is that Subject and Verb are phrased together, and Object is phrased alone.

$$(22) ( \text{Subj} \quad \text{Infl} \quad V-\nu)_{\phi} ( \langle V \rangle \quad \text{Obj})_{\phi}$$

This is different from the predictions made by Relation-based theory and Edge-based theory, repeated here.

- (23) a. (Subj)<sub>φ</sub> (Infl V)<sub>φ</sub> ( Obj )<sub>φ</sub>  
 b. (Subj)<sub>φ</sub> (Infl V Obj)<sub>φ</sub>

One crucial difference between (22) and (23) is that Subj is phrased with V (and Infl) in (22) while it is phrased alone in (23).

So far I have been presupposing that the unit of Spell-Out corresponds to a p-phrase as it is. However, as I will argue in the next sections, the unit of Spell-Out may not correspond to a p-phrase directly due to the interaction between Multiple Spell-Out and Linearization.

### 3.3 Linearization

Before going into the formulation of phonological phrasing within the label-free theory and Multiple-Spell-Out theory, I propose a theory of Linearization.

Kayne (1994) proposes the following axiom:

(24) Linear Correspondence Axiom

$d(A)$  is a linear ordering of  $T$ . (Kayne 1994: 6)

Here,  $A$  is the maximal set that contains all pairs of nonterminals such that the first asymmetrically c-commands the second,  $d$  is the nonterminal-to-terminal dominance relation,  $d(A)$  is the set of terminals that  $A$  dominates, and  $T$  is the set of terminals (Kayne 1994). Under (24), all the nodes, i.e., projections, of a given phrase structure enter into asymmetric c-command relations, and such relations are mapped to a linear order of terminal elements.

A problem with (24) within the label-free theory is that it is necessary to distinguish a category from a segment (Kayne 1994), or that it is necessary to assume that X-bar level is invisible (Chomsky 1995b: 242, 336). In the label-free theory, it is impossible to define the category/segment distinction, and it is impossible to assume that X-bar level is invisible, because there is no label/projection. In order to avoid these problems, I assume that the c-command relations among terminal elements, but not non-terminals, are relevant to the theory of Linearization.

Under this assumption, I propose that a set which contains all the pairs of asymmetric syntactic relations is matched with the linear order. I assume that the relevant asymmetric syntactic relations are asymmetric c-command relation between terminal elements and OCC checking relation.<sup>11</sup>

(25) Linear Order reflects asymmetric relations defined by:

- (a) Asymmetric c-command between terminal elements
- (b) OCC

C-command is defined derivationally, without referring to the projections, along the lines of Epstein (1999).<sup>12</sup> The OCC feature of X is checked if a

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<sup>11</sup> I put aside the other syntactic relations like thematic relations and subcategorizations discussed in Collins (2001a). See also Collins and Ura 2001.

<sup>12</sup> Epstein (1999) defines c-command as follows:

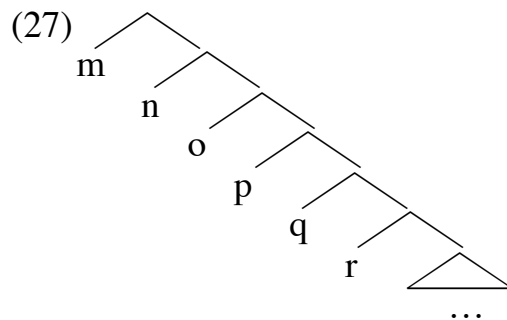
- (i) X c-commands all and only the terms of the category Y with which X was paired/concatenated by Merge in the course of the derivation. (Epstein 1999: 329)

constituent Y is (internally) merged to a position that is close to X. In other words, the OCC feature of X is checked if Y is merged in the “Spec” of X.

I assume that these relations are mapped to precedence in the following manner:

- (26) a. If X asymmetrically c-commands Y, X precedes Y.  
 b. If X checks Y’s OCC feature, X precedes Y.

Under these assumptions, let us consider the following phrase structure:



Suppose that n, p, and r have an OCC feature that is checked by m, o, q. That is, n, p, and r are “heads” and m, o, and q are “Specs” in a traditional sense. Suppose also that m, o, and q are constituents that have some internal structure (that is, they are branching). Then, all the asymmetric syntactic relations that hold in (27) are following:

- (28) a.  $\langle m, n \rangle_{\text{OCC}}$

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I take the “terms of the category Y” to be the “lexical items that make up the constituent Y” to avoid the reference to projections.

- b.  $\langle o, p \rangle_{OCC}$
- c.  $\langle q, r \rangle_{OCC}$
- d.  $\langle n, o \rangle_{C-COM}$
- e.  $\langle n, p \rangle_{C-COM}$
- f.  $\langle n, q \rangle_{C-COM}$
- g.  $\langle n, r \rangle_{C-COM}$
- h.  $\langle p, q \rangle_{C-COM}$
- i.  $\langle p, r \rangle_{C-COM}$

(28a) stands for “m checks an OCC feature of n,”<sup>13</sup> (28d) stands for “n asymmetrically c-commands (lexical items that constitute) o,” etc. Since m, o, q are branching, the terminal elements internal to them do not c-command anything outside of them. Then, it is clear that (28) does not qualify as *A*: It fails to give a unique linear order to the phrase structure in (27) since it is not total. It lacks  $\{\langle m, o \rangle, \langle m, p \rangle, \langle m, q \rangle, \langle m, r \rangle, \langle o, p \rangle, \langle o, q \rangle, \langle o, r \rangle\}$ .

However, suppose that the linear order is defined locally so that the totality of the linear order is met in the local domain. Suppose that such a domain is defined as follows:

(29) C-command Domain of X:

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<sup>13</sup> Strictly speaking, one of the terminal elements of the constituent m checks the OCC feature of n, and the constituent m is merged in the Spec

The lexical items X, Y, and any terminal element c-commanded by X but not Y.

Thus in (27), the c-command domain of n is {n, o, p}, and the c-command domain of p is {p, q, r}. Note that since I am assuming that o and q are branching in (27), the terminal elements within o and q do not c-command p and r, respectively, but they are c-commanded by n and p, respectively. For these domains, we have the following sets of asymmetric syntactic relations, which are subsets of (28):

- (30) a. C-command domain of n:  $\{ \langle n, o \rangle_{C-COM}, \langle n, p \rangle_{C-COM}, \langle o, p \rangle_{OCC} \}$   
 b. C-command domain of p:  $\{ \langle p, q \rangle_{C-COM}, \langle p, r \rangle_{C-COM}, \langle q, r \rangle_{OCC} \}$

For these domains, the linear order is defined since each set of pairs is transitive, total and antisymmetric:

- (31) a.  $n \ll o \ll p$   
 b.  $p \ll q \ll r$

Here, “ $\ll$ ” stand for “precedes.”

The next step is to combine these two linearly ordered strings into one, giving the linear order to {n, o, p, q, r}. Notice that p is shared by the two sets in (30a) and (30b). It is the final element in (31a), and the initial element in (31b). I propose that the two strings in (31) are linearly

---

of n. I will discuss the linear ordering of the branching specifiers in detail at the end of this chapter.

ordered by virtue of the shared member  $p$  so that the resulting linear order for  $\{n, o, p, q, r\}$  is consistent with the linear order defined for each  $c$ -command domain:

(32) *Assembly Process:*

Let us call the linear order defined for a  $c$ -command domain a local string. The linear order between the two local strings is defined by virtue of the shared member so that it is consistent with each local string.

Thus, we obtain the following linear order for  $\{n, o, p, q, r\}$ :

(33)  $n \ll o \ll p \ll q \ll r$

The linear order in (33) is equivalent to Spec-Head-Complement order.

Notice that any other ordering of the members of  $\{n, o, p, q, r\}$  than (33) is inconsistent with (31). Consider the following linear order for example:

(34)  $n \ll o \ll p \ll r \ll q$

This is inconsistent with (31b).<sup>14</sup>

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<sup>14</sup> Note that if there are two or more (branching) specifiers for one head, the linear order between them cannot be determined, since the terminal elements of neither specifier have  $c$ -command or OCC relations with those of the other. This result is similar to the one achieved by Kayne (1994) and Moro (2000). Since the multiple specifiers are usually created as a result of Internal Merge, the linear order between them would be

### 3.4. Proposals: Multiple Spell-Out and Phonological Phrasing

As I showed in section 3.2, if the unit of Multiple Spell-Out corresponds to a phonological phrase as it is, the following phonological phrasing is obtained:

$$(35) (C)_\phi ( \text{Subj} \quad \text{Infl} \quad \nu )_\phi ( V \quad \text{Obj} )_\phi$$

However, assuming the empirical adequacy of the previous theories, the desired phrasing should be as follows, where Subj is phrased alone:

$$(36) \quad \text{a. } (\text{Subj})_\phi (\text{Infl} \quad V)_\phi (\text{Obj})_\phi$$

$$\quad \text{b. } (\text{Subj})_\phi (\text{Infl} \quad V \quad \text{Obj})_\phi$$

In this section, I combine the proposed theory of Linearization and Multiple Spell-Out theory, and show that the desired phrasing can be obtained.

I assume that Spell-Out defines linear order since it connects the narrow syntax NS, where there is no linear order among lexical items, with the phonological component  $\Phi$ , where phonological strings are linearly ordered:

$$(37) \quad \text{Spell-Out defines linear order.}$$

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determined so that it reflects the base order (Ken Hiraiwa, personal communication). I leave the issue of multiple specifiers open in this thesis.



Consider the following hypothetical phrase structure:<sup>15</sup>

(38)  $[_{CP} C [_{IP} \text{Subj Infl } [_{vP} \text{XP } v [_{VP} V \text{Obj } ]]]]$

Here, Subj and XP satisfy Infl and  $v$ 's OCC features, respectively.<sup>16</sup>

Suppose that Spell-Out applies to the sister of  $v$ . Then, the linear order within this constituent is defined by virtue of the fact that V c-commands Obj:

(39) Spell-Out (Sister of  $v$ )

Linear Order:  $V \ll \text{Obj}$

Suppose that the sister of C is spelled-out:

(40) Spell-Out(Sister of C)

- a. Linearization of C-command domain of  $v$ :  $v$
- b. Linearization of C-command domain of Infl:  $\text{Infl} \ll \text{XP} \ll v$
- c. Linearization of the rest:  $\text{Subj} \ll \text{Infl}$
- d. As a whole:  $\text{Subj} \ll \text{Infl} \ll \text{XP} \ll v$

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<sup>15</sup> In the derivational framework (especially in the label-free syntax) adopted here, the phrase structure is built in a bottom-up fashion. See (20).

<sup>16</sup> Here, XP is not a  $vP$ -internal subject, but a (hypothetical) phrase that has been internally merged into the Spec of  $vP$ .

Note that V and Obj were spelled-out before and they are not available to this Spell-Out.<sup>17</sup> In the domain of the Spell-Out of the sister of C, there are three domains in which linear order is defined: the c-command domains of  $v$  and Infl, and the rest of the structure. In the c-command domain of  $v$ , there is only  $v$ . So the linear order is vacuously defined, as in (40a). In the c-command domain of Infl, the linear order  $\text{Infl} \ll \text{XP} \ll v$  is defined, as in (40b). In the rest of the structure,<sup>18</sup>  $\text{Subj} \ll \text{Infl}$  is defined since Subj checks the OCC feature of Infl, as in (40c). As a whole, the linear order  $\text{Subj} \ll \text{Infl} \ll \text{XP} \ll v$  is defined by virtue of the shared elements Infl and  $v$ .

The next step is to give a linear order between the linear string  $V \ll \text{Obj}$  defined by the Spell-Out applying to the sister of  $v$  and the linear string  $\text{Subj} \ll \text{Infl} \ll \text{XP} \ll v$  defined by the Spell-Out applying to the sister of C. However, it is not clear how these two strings are ordered with respect to each other. There is no a priori reason to assume that the string that is created later in the derivation precedes the string created earlier. Let us call this problem *Assembly Problem*.<sup>19</sup>

Recall that in the previous section I proposed that the two strings of linear order defined for the two different c-command domains are linearly ordered in terms of a shared member of the two strings. Suppose the

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<sup>17</sup> I am putting aside the V-movement to  $v$  here. Following Chomsky (1995b: 368), I assume that V movement does not take place in narrow syntax.

<sup>18</sup> Here, I assume that Subj and Infl form a domain for the local linearization (29) since Subj is not c-commanded by Infl (= “Y” in (29)), and Subj does not belong to any other c-command domain in the domain of this Spell-Out.

<sup>19</sup> Thanks to Chris Collins for suggesting this term to me.

order between the two strings of the units of Spell-Out is also defined in terms of a shared member. Notice that the linear strings in (39) and (40d) do not have a shared member by which two strings can be ordered with respect to each other. To define the linear order between the two strings, V or Obj in (39) should be available to the domain of the next Spell-Out.

Suppose that the initial element in the linear string is available to the next Spell-Out. Thus, in (39), V is available to the next Spell-Out. In order for an element in the domain of Spell-Out to be available to the next Spell-Out, the initial element should remain to be sent to the phonological component  $\Phi$ .

To formulate this idea, I propose that the initial element in the string defined by Spell-Out escape the mapping to  $\Phi$ . I assume that Spell-Out maps the string to  $\Phi$  except for the initial element.

(41) Spell-Out sends a linearly ordered string to  $\Phi$  except for the initial element in the string.

This mapping is illustrated below:

- (42) a. Syntax: [n [o [p [q [r ...  
 b. Spell-Out (Sister of n)  
 i. Linear Order: o << p << q << r  
 ii. Mapping to  $\Phi$ : p << q << r

Suppose that the  $D_{NS}$  created the structure shown in (42a), where  $n$  and  $r$  are phase heads.<sup>20</sup> Thus, the sister of  $r$  has already been spelled-out earlier in the derivation (I will return to the initial element in the sister of  $r$  shortly. Here I assume that the sister of  $r$  is phonologically vacuous). At the point in (42a), Spell-Out spells out the sister of  $n$ , i.e.,  $o$ ,  $p$ ,  $q$  and  $r$ , and it defines the linear order among them, as in (42b.i).<sup>21</sup> Then it maps the string “ $p \ll q \ll r$ ” to  $\Phi$ , as in (42b.ii). Here, Spell-Out does not map  $o$  to  $\Phi$  since it is the initial element in the string, under (41). Therefore, the rest of the string is sent to  $\Phi$ .

I propose that this string corresponds to a (potential) p-phrase.

- (43) A phonological string that is mapped to  $\Phi$  by Spell-Out corresponds to a (potential) p-phrase.

This is a null hypothesis. Since Spell-Out is the only interface operation that sends  $D_{NS}$  to  $\Phi$ , the output unit of Spell-Out is the only unit that may correspond to some local domain in  $\Phi$ .<sup>22</sup> (43) states that such a domain is a p-phrase. It is not a p-phrase formation mechanism like (16) or (17) that refers to some syntactic information such as maximal projections. Under

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<sup>20</sup> Here and below, I use the term “phase” to refer to a “strong phase,” unless the distinction between the strong and weak phases is necessary.

<sup>21</sup> Strictly speaking,  $o$ ,  $p$ ,  $q$ ,  $r$  in (41b-c) are just phonological features of  $o$ ,  $p$ ,  $q$ ,  $r$  in (41a).

<sup>22</sup> It follows that Intonational Phrase, a prosodic domain larger than a p-phrase, should be created by assembling a p-phrase within  $\Phi$ , without access to syntax.

(43), the p-phase formation that appears to reflect syntactic information in fact reflects the unit of the mapping to  $\Phi$ .

Thus, the following p-phase is obtained in  $\Phi$  for the Spell-Out in (42):

(44)  $(p\ q\ r)_\phi$

Now, let us consider how the two units of Spell-Out are mapped to  $\Phi$ . Consider (45), where n and r are phase heads:

- (45) a. Syntax:  $[n\ [o\ [p\ [q\ [r\ [s\ [t\ u\ ]]]]]]]]$   
 b. Spell-Out (Sister of r)  
     i. Linear Order:  $s \ll t \ll u$   
     ii. Mapping to  $\Phi$ :  $t \ll u$   
 c. In  $\Phi$ :  $(t\ u)_\phi$   
 d. Spell-Out (Sister of n)  
     i. Linear Order:  $o \ll p \ll q \ll r \ll s$   
     ii. Mapping to  $\Phi$ :  $p \ll q \ll r \ll s$   
 e. In  $\Phi$ :  $(p\ q\ r\ s)_\phi (t\ u)_\phi$

First, Spell-Out spells-out s, t, and u. It linearizes them as in (45b.i), and maps the linearly ordered string to  $\Phi$  as in (45b.ii). Here, s escapes the mapping since it is the initial element. As a result of the mapping, “t u” corresponds to a p-phase in  $\Phi$  as in (45c). The next Spell-Out applies to the sister of n. It spells out o, p, q and r. Here, the linear order is defined on the elements that are spelled-out by this Spell-Out, i.e., o, p, q, r, and the element that escaped the previous mapping to  $\Phi$ , i.e., s. The

linear order is defined on  $o$ ,  $p$ ,  $q$ ,  $r$  and  $s$  as in (45d.i).<sup>23</sup> Then, this string is mapped to  $\Phi$ , except for the initial element  $o$ . That is, “ $p \ll q \ll r \ll s$ ” is mapped to  $\Phi$ . When this mapping occurs, the string “ $p \ll q \ll r \ll s$ ” is ordered with respect to “ $t \ll u$ ” in terms of the linear order defined in (45b.i), where  $s$  precedes  $t$ . Therefore the string “ $p \ll q \ll r \ll s$ ” precedes the string “ $t \ll u$ ” and the string “ $p \ll q \ll r \ll s$ ” corresponds to a p-phrase in  $\Phi$ , as in (45e), where  $(p \ q \ r \ s)_\phi$  precedes  $(t \ u)_\phi$ . In this way, the Assembly Problem is resolved.

Given these considerations, let us reconsider the Spell-Out in the derivation of (38), repeated here.

(38) [<sub>CP</sub> C [<sub>IP</sub> Subj Infl [<sub>vP</sub> XP  $v$  [<sub>VP</sub> V Obj ]]]]

First, Spell-Out applies to the sister of  $v$ .

(46) S-O(Sister of  $v$ )

- a. Linear Order:  $V \ll \text{Obj}$
- b. Mapping to  $\Phi$ :  $\text{Obj}$
- c. In  $\Phi$ :  $(\text{Obj})_\phi$

Spell-Out defines the Linear Order, as in (46a), and this Linear Order is mapped to  $\Phi$  as in (46b), and  $\text{Obj}$  corresponds to a p-phrase, as in (46c). When the mapping occurs in (46b), the initial element in the Linear Order,

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<sup>23</sup> Of course, the linear order among these elements are first defined for each local domain (29), and then combined under (32), resulting in  $o \ll p \ll q \ll r \ll s$ , as in (45d).

i.e.,  $V$ , escapes the mapping under (41), and still remains accessible to the next Spell-Out.

Next, the sister of  $C$  is spelled-out:

(47) S-O(Sister of  $C$ )

- a. Linearization of  $C$ -command domain of  $v$ :  $v \ll V$
- b. Linearization of  $C$ -command domain of Infl:  $\text{Infl} \ll \text{XP} \ll v$
- c. Linearization of the rest:  $\text{Subj} \ll \text{Infl}$
- d. Linear Order:  $\text{Subj} \ll \text{Infl} \ll \text{XP} \ll v \ll V$
- e. Mapping to  $\Phi$ :  $\text{Infl} \ll \text{XP} \ll v \ll V$
- f. In  $\Phi$ :  $(\text{Infl XP } v \text{ V})_{\phi} (\text{Obj})_{\phi}$

First, Linear Order is defined for the  $C$ -command domain of  $v$ , as in (47a). Here,  $V$ , which was not mapped to  $\Phi$  in the previous Spell-Out, is still accessible. Because  $v$  asymmetrically  $c$ -commands  $V$ , Linear Order defined here is not just  $v$  but  $v \ll V$ , unlike (40a). Linear Order of the  $C$ -command domain of Infl is defined as in (47b), and that of the rest of the structure is defined as in (47c). Then, these strings of Linear Order are combined as in (47d) by virtue of the shared elements  $v$  and Infl. And this Linear Order undergoes the mapping to  $\Phi$ . Here the initial element Subj escapes the mapping under (41). That is, the string “Infl  $\ll$  XP  $\ll$   $v \ll$  V” is mapped to  $\Phi$ , as in (47e). In the process of this mapping, the string “Infl  $\ll$  XP  $\ll$   $v \ll$  V” is ordered with respect to “Obj” in terms of the Linear Order in (44a) which was defined by the previous Spell-Out. In  $\Phi$ , the mapping results in a  $p$ -phrase  $(\text{Infl XP } v \text{ V})_{\phi}$ , which precedes  $(\text{Obj})_{\phi}$ , as in (47f).

The next step is to spell-out the rest of the structure:

(48) S-O(Root)

- a. Linearization of C-command domain of C:  $C \ll \text{Subj}$
- b. Mapping to  $\Phi$ :  $(C \ll )\text{Subj}$
- c. In  $\Phi$ :  $(\text{Subj})_{\phi} (\text{Infl XP } \nu \text{ V})_{\phi} (\text{Obj})_{\phi}$

Since Subj escaped the mapping to  $\Phi$  in the previous Spell-Out, it is accessible here. Thus in (48a), Linear Order “ $C \ll \text{Subj}$ ” is defined since C asymmetrically c-commands Subj, and Subj is mapped to  $\Phi$ , as in (48b). Note that since this is the Spell-Out of the root, C could be mapped together here.<sup>24</sup> In this mapping process, “Subj” is ordered with respect to “ $\text{Infl} \ll \text{XP} \ll \nu \ll \text{V}$ ” in terms of the Linear Order (47d) (or probably just (47c)) defined by the previous Spell-Out. In  $\Phi$ , the phonological phrasing shown in (48c) is obtained.

As a result of the linearization and mapping to  $\Phi$  by Spell-Out, the following phonological phrasing is obtained:<sup>25</sup>

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<sup>24</sup> In Relation-based and Edge-based theory (Align-XP, R), it is predicted that C is phrased together with Subj. However, this might be due to the fact that C is a functional category, which usually does not correspond to a single p-phrase alone. I will leave this issue open here. See Chapters 2 and 4 for relevant discussion.

<sup>25</sup> If Spell-Out applies at each step of syntactic derivation, as suggested by Epstein et al (1998: 157), then a phonological phrase cannot be defined simply as a unit of the mapping to the phonological component since it would be predicted that each terminal element is phonologically phrased alone, contrary to the phrasing in (49). In such a theory, an independent phonological phrasing algorithm would need to be adopted. As shown by



$$(49) \quad [_{CP} \quad C \quad [_{IP} \quad \text{Subj} \quad \text{Infl} \quad [_{vP} \quad \text{XP} \quad v \quad [_{VP} \quad V \quad \text{Obj} \quad ]]]]] \\
(C \quad \text{Subj})_{\phi} \quad (\text{Infl} \quad \text{XP} \quad v \quad V)_{\phi} \quad (\text{Obj})_{\phi}$$

Here, Obj is not p-phrased with V, and Subj is not p-phrased with the elements that follow it. This is exactly the same as the prediction made by the Relation-based theory of phonological phrasing, repeated here.

$$(50) \quad (\text{Subj})_{\phi} \quad (\text{Infl} \quad V)_{\phi} \quad (\text{Obj})_{\phi}$$

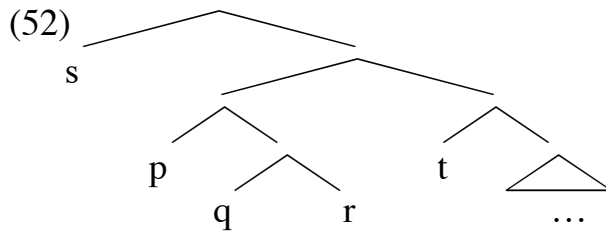
In the next chapter, I will argue that the following phrasing predicted by the Edge-based theory and the optional application of restructuring in the Relation-based theory is obtained by the restructuring of p-phrases for purely phonological reasons or by the syntactic movement of Obj to the Spec of  $v$  and syntactic movement of V to Infl:

$$(51) \quad (\text{Subj})_{\phi} \quad (\text{Infl} \quad V \quad \text{Obj})_{\phi}$$

So far I have glossed over the internal structure of the specifiers. Let us consider it closely. Consider the following structure within the proposed system:

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the large literature on phonological phrasing (see also the following chapters of this thesis), phrasing in (49) is indeed correct.



Suppose that  $q$  checks the OCC feature of  $t$ , and the constituent containing  $p$ ,  $q$  and  $r$  is internally merged in the Spec of  $t$ . That is,  $q$  checks the OCC feature of  $t$ , and  $q$  pied-pipes the constituent containing  $p$ ,  $q$ ,  $r$ , and is internally merged in the Spec of  $t$ . In this structure, the syntactic relations relevant to the Linearization within the C-command Domain of  $s$  is as follows:

- (53)
- a.  $\langle s, p \rangle_{C-COM}$
  - b.  $\langle s, q \rangle_{C-COM}$
  - c.  $\langle s, r \rangle_{C-COM}$
  - d.  $\langle q, t \rangle_{OCC}$
  - e.  $\langle s, t \rangle_{C-COM}$

Since I am assuming that the c-command relation between the terminal elements are relevant, the order among  $s$ ,  $t$  and the constituent containing  $p$ ,  $q$ ,  $r$  cannot be obtained straightforwardly. A subset of (53) that satisfies totality, transitivity, and antisymmetry is the one shown in (54a), and the linear order shown in (54b) is defined for (54a) with reference to (53b, d, e):

- (54) a.  $\{s, q, t\}$

b.  $s \ll q \ll t$

Note that the linear order among  $p, q, r$  is defined independently within the constituent containing them. Suppose that the linear order  $p \ll q \ll r$  is obtained within the constituent.

(55)  $p \ll q \ll r$

Then, we need to combine (54) and (55) in terms of the shared member  $q$ . Then, the following orders are logically possible:

- (56)
- a.  $s \ll p \ll q \ll r \ll t$
  - b.  $p \ll s \ll q \ll r \ll t$
  - c.  $p \ll s \ll q \ll t \ll r$
  - d.  $s \ll p \ll q \ll t \ll r$

Among these, (56a) is the desired one. In order to obtain (56a), it is necessary to conserve the linear order (55) including the adjacency. That is, if (55) is defined first, and if nothing may interpolate into the defined linear order later in the derivation, then (56a) can be obtained when (54b) is defined. I assume that the following condition holds:<sup>26</sup>

(57) *Ban on Interpolation:*

Once the linear order is defined on the string  $X$ , then nothing may interpolate into  $X$  later in the derivation.

That is, the linear order of  $X$ , once defined, is conserved throughout the derivation and cannot be disrupted later in the derivation. Then (56a) is the only possible linear order if the linear order within the Spec of  $t$  is defined before the one within the entire phrase structure in (52). (56b), for example, violates (57) since  $s$  interpolates into the linear string  $p \ll q \ll r$ , and  $p \ll q \ll r$  is disrupted. Following the basic ideas explored by Uriagereka (1999), I assume that this is indeed the case: The linear order within the Spec is defined before the one within the entire domain of the Spell-Out.

Now suppose that the structure in (52) is the sister of a strong phase head. When it is spelled-out, the following sets of asymmetric relations are defined at once by Spell-Out:

- (58)
- a.  $\langle s, p \rangle$
  - b.  $\langle s, q \rangle$
  - c.  $\langle s, r \rangle$
  - d.  $\langle q, t \rangle$
  - e.  $\langle s, t \rangle$
  - f.  $\langle p, q \rangle$
  - g.  $\langle q, r \rangle$
  - s.  $\langle p, r \rangle$

Since the set  $\{s, p, q, r, t\}$  is not total, asymmetric, transitive given (58), Spell-Out has to divide the set into the subsets so that the linear order can

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<sup>26</sup> Thanks to John Bowers for helping me formulate (57).

be properly defined. Suppose that the information that  $q$  pied-piped  $p$  and  $r$  is accessible to the Spell-Out because of the OCC feature checking relation. Then, the following condition can be formulated:

- (59) Spell-Out first defines the linear order within the constituent that underwent merge as a result of OCC feature checking.

Thus, Spell-Out first selects the subset that corresponds to the constituent that underwent merge as a result of OCC feature checking as in (60a), and defines the linear order as in (60b):

- (60) a.  $\{p, q, r\}$   
 b.  $p \ll q \ll r$

Then, Spell-Out selects the subset from (58) for the rest of the structure as in (61a), and defines the linear order as in (61b):

- (61) a.  $\{s, q, t\}$   
 b.  $s \ll q \ll t$

And under (57), the only linear order that is consistent with (60b) and (61b) is  $s \ll p \ll q \ll r \ll t$ .

Now let us consider how the initial element is determined if the branching Spec is at the edge of the domain of Spell-Out. Suppose that  $s$  is a strong phase head in (52). Thus, the sister of  $s$  undergoes Spell-Out. Suppose also that  $p$  checks the OCC feature of  $q$  within the Spec, and  $q$

checks the OCC feature of  $t$ . Then, given the proposals in this Chapter, some element has to escape the mapping to  $\Phi$  as the initial element in the domain of the Spell-Out. The “initial” element in this domain is  $p$  if it is taken in a literal sense. However, if only  $p$  escapes the mapping to  $\Phi$ , then we cannot solve the Assembly Problem since  $p$  does not have any syntactic relation with  $t$ : it does not check the OCC feature of  $t$ , and it does not  $c$ -command  $t$ . Therefore,  $p$  cannot be the initial element. If only  $q$  escapes the mapping to  $\Phi$ , then  $p$  and  $r$  would be mapped to  $\Phi$  leaving  $q$ , and it might be predicted that such discontinuous syntactic elements are phonologically phrased together. Therefore, I assume that the constituent that is pied-piped by the OCC-checker serves as the initial element. In this case, the constituent containing  $p, q, r$  is the initial element.

Then, when the sister of  $s$  is spelled-out, the linear order  $p \ll q \ll r \ll t$  is defined, and  $t$  (and the elements in its  $c$ -command domain) is mapped to  $\Phi$ . In Chapter 3 and 4, I will show that this assumption is empirically correct.

#### **4. Summary**

In this chapter, I proposed a theory of Linearization within the framework of label-free syntax. I pointed out that it is not clear how the two units of Spell-Out are linearly ordered with respect to each other in the Multiple Spell-Out theory (the Assembly Problem). To solve this problem, I proposed that the initial element in the linear string of each Spell-Out should be available to the next Spell-Out, and it should escape the mapping to  $\Phi$ . Under this proposal, I argued that the string that is mapped to  $\Phi$  corresponds to a potential  $p$ -phrase.

## Chapter Two

### Phonological Phrasing and Prosodic Branching

#### 1. Introduction

In this chapter, I examine some cases of cross-linguistic variation in phonological phrasing under the proposed theory of syntax-phonology mapping. I argue that the variation can be accounted for in terms of (i) the syntactic structure, and (ii) the restructuring of phonological phrasing due to the prosodic branching condition (Inkelas and Zec 1995). I propose that the restructuring takes place for purely phonological reasons (cf. Ghini 1993), and that it is parameterized in the following way: First, it may or may not apply in a language, and second, if it may apply, it applies to the left or right.

I examine S-V-O word order in various languages. I show that S-V-O word order exhibits the following phonological phrasing patterns (See Bickmore (1990, 1991) for relevant discussions):

- (1) a. Ewe (Aɲlɔ dialect) and French:  $(S)_\phi (V)_\phi (O)_\phi$   
b. Italian:  $(S)_\phi (V)_\phi (O)_\phi$  or  
 $(S)_\phi (V O)_\phi$  if O is non-branching  
c. Kimatuumbi:  $(S)_\phi (V O)_\phi$   
d. Kinyambo:  $(S)_\phi (V O)_\phi$  or  
 $(S V)_\phi$  if S is non-branching

I argue that (1a)/(1c)-type languages do not allow restructuring, and that the difference between these languages are purely structural: If the object

moves to a higher position, then it is phrased with the verb; if it does not, it is not phrased with the verb. In contrast, I argue that (1b)/(1d)-type languages allow restructuring, and that the difference between them is due to the directionality of restructuring, which is parameterized. In the proposed accounts, the only syntactic information available to  $\Phi$  is the string mapped by Spell-Out, and no other syntactic information is needed to account for the phrasing pattern shown in (1).

This chapter is organized as follows: In Section 2, I introduce data from the Aɲlɔ dialect of Ewe (Clements 1978), colloquial French (Nespor and Vogel 1986, Selkirk 1974, 1984), Italian (Frascarelli 2000, Ghini 1993, Nespor and Vogel 1986), Kimatuumbi (Odden 1987, 1990, 1996), and Kinyambo (Bickmore 1989, 1990). In Section 3, I give an account for these data within the proposed theory of syntax-phonology mapping. Section 4 is a summary.

## **2. Data**

### **2.1 Aɲlɔ Dialect of Ewe and Colloquial French**

In this section, I examine the phonological phrasings in the Aɲlɔ dialect of Ewe and colloquial French. I show that the phonological phrasing in these languages exhibits the pattern where S, V and O are phrased separately.

Clements (1978) discusses the phonological phrasing in the Aɲlɔ dialect of Ewe. He shows that mid tone (M) raising applies within a p-phrase. *M raising* is formulated as follows:



## (2) M Raising

$$M \rightarrow R / H \_ H \quad (\text{Clements 1978: 47})$$

M tone is raised to extra-high tone (R) if it is surrounded by H tones.

Thus in (3), the underlying form in (3a) is realized as in (3b):

(3) a. /àtyí mēgbé/

tree behind

‘behind a tree’ (Clements 1978: 24)

b. [àtyĩ mēgbé] (Clements 1978: 25)

Note that the environment for M raising here is met across a word boundary. The H that precedes M is in the preceding word. Note also that there are two other rules applying in this example: *R Spread* and *Cadence* (Clements 1978: 25, 49). *R Spread* spreads an R tone both rightward and leftward until M or L, and *Cadence* changes an R-R sequence in the domain-final position to R-H. Clements assumes that these rules apply in the following order.

(4) àtyí mēgbé → apply M Raising →

àtyí mēgbé → apply R Spread →

àtyĩ mēgbé → apply Cadence →

àtyĩ mēgbé (Clements 1978:25)

Given these background assumptions, let us first see whether the M Raising applies between the subject and the element that follows it.

Consider the following:

- (5) *mí ā-dzó*  
 we T-leave  
 ‘we will leave’ (Clements 1978: 62)

Here, the M tone is surrounded by H tones. If *mí* and *ā-* belonged to the same p-phrase, the M would be raised to the extra-high R. However, it is not raised, indicating that the M tone does not satisfy the environment in (3). That is, there is a phonological phrase boundary between the subject and the tense morpheme on the verb and the environment in (3) is not met within the domain or p-phrase. Therefore, the subject is not phonologically phrased with the verb.

Let us next consider whether the object is phrased with the preceding verb. Consider (6):

- (6) a. *kpó ānyí*  
 see bee  
 ‘saw a bee’ (Clements 1978: 24)
- b. *kpó ānyí* (Clements 1978: 25)
- c. *\*kpó ǎnyí* (Clements 1978: 25)

(6a) shows the underlying form, which is realized as in (6b). If *kpɔ* ‘see’ and *ānyɪ* ‘bee’ belonged to the same phonological phrase, they would satisfy the environment in (3) since the M is surrounded by H’s. However, M is not raised in (6b). As (6c) shows, if M is raised, the result is unacceptable. Therefore, there is a phonological phrase boundary between the verb and the object.

To summarize, the phonological phrasing in Ewe is as follows:

(7) (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub>

Let us next consider French. Nespore and Vogel (1986: 179) argue that in the colloquial variety of French, “Liaison applies in a purely phonological environment.” (See Selkirk 1974 for the discussion of Liaison in elevated speech.) That is, Liaison in colloquial speech reflects the basic phonological phrasing in French.<sup>1</sup> Liaison is a phenomenon where the word final-consonant is pronounced if it is followed by the word that begins with a vowel. Let us consider (8):

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<sup>1</sup> Selkirk (1974: 581) states that in the situation where the domain of the liaison is extended in elevated speech, “we will say that the grammar of the elevated style contains a readjustment rule which applies in those additional phrase structure domains of surface structure to reduce occurrences of double word boundaries to single word boundaries,” indicating that the phonological phrasing in elevated speech results from the restructuring of phonological phrasing.

(8) a. les enfants

[lezãfã]

‘the children’

Selkirk (1984: 333)

b. les filles

[le fij]

‘the girls’

Selkirk (1984: 333)

In (8a), the determiner *les* ends with a consonant and is followed by a vowel, and the consonant is pronounced. In (8b), the same determiner precedes a word with an initial consonant, and the final consonant of the determiner *les* is not pronounced.

Given these, let us consider the following examples:<sup>2</sup>

(9) a. Les immigrants / envoyaient / des lettres / à leurs familles.

The immigrants sent Indef.letters to their families

‘The immigrants were sending letters to their families.’

Selkirk (1974: 580)

b. les enfants accouraient

‘the children ran up’

Selkirk (1984: 333)

i. [lezãfã akurɛ]

ii. \*[lezãfãzakurɛ]

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<sup>2</sup> The glosses on French data from Selkirk (1974) were given by the present author. Thanks to Eunchong Cho for her help.

In (9a), Liaison does not apply between the subject *les immigrants* and the verb *envoyaient*, according to Selkirk (1974:580). Similarly, in (9b), the subject *les enfants* ‘the children’ ends in a consonant and is followed by a verb with an initial consonant, and Liaison fails to apply between the subject and the verb as shown in (9b.i-ii), indicating that there is a phonological phrase boundary between the subject and the following verb. Therefore, the subject and the verb are phrased separately in French.

Let us next consider the following example:

- (10) L’immigré / envoyait / un paquet / à sa famille.  
 the immigrant sent a package to his family  
 ‘The immigrant was sending a package to this family.’

Selkirk (1974: 580)

Here, the verb *envoyait* ends with a consonant, and the object *un paquet* begins with a vowel. However, Liaison fails to apply here, according to Selkirk (1974: 580), indicating that there is a phonological phrase boundary between the verb and the object.

In sum, (colloquial) French shows the following phrasing:

- (11) (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub>

## 2.2 Italian

In this section, I examine the phonological phrasing in Italian. According to Nespor and Vogel (1986: 38), *Raddoppiamento Sintattico* is observed

in central and southern varieties of Italian.<sup>3</sup> It is a phonological rule which applies between words within a phonological phrase. In a sequence of word1 word2, the initial consonant of word2 is lengthened (i) if word1 ends in a vowel with the main stress of the word, and (ii) the initial consonant of word2 is followed by a non-nasal sonorant. Thus in (12), the initial consonant of *banana* ‘banana’ is lengthened since the preceding word *metá* ‘half’ ends in a vowel with the main stress and the initial consonant *b* of *banana* is followed by a vowel:<sup>4</sup>

- (12) La scimmia aveva appena mangiato metá [b:]anana  
 the monkey had just eat.PP half banana  
 ‘The monkey had just eaten half a banana’

Nespor and Vogel (1986: 38)

However, even if the conditions shown above are met, Raddoppiamento Sintattico fails to apply in some cases:

- (13) La volpe ne aveva mangiato metá [p]rima di addormentarsi.  
 the fox of.it had eat.PP half before of go.to.sleep  
 ‘The fox had eaten half of it before falling asleep.’

Nespor and Vogel (1986: 38)

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<sup>3</sup> See also Frascarelli 2000 and Ghini 1993. In northern Italian, *Stress Retraction* (Nespor and Vogel 1986: 174) or *Rhythm Rule* (Frascarelli 2000: 20) is sensitive to phonological phrasing. See Frascarelli (2000:20).

<sup>4</sup> Word-by-word glosses for the examples cited from Nespor and Vogel 1986 are given by the present author. Thanks to Tanya Matthews for her help.

Here, *prima* ‘before’ begins with a consonant *p* followed by a non-nasal sonorant *r*, and is preceded by *metá* ‘half,’ which ends in a stressed vowel, but *p* of *prima* is not lengthened. Nespor and Vogel 1986 argue that this is due to the presence of a phonological phrase boundary and propose the following formalization of the rule (adapted from Nespor and Vogel 1986: 170, see also Frascarelli 2000: 20):

(14) Raddoppiamento Sintattico

$$C \rightarrow [+long] / [ \dots [ \dots V ]_{\omega} [ \_\_\_ [+son, -nas] \dots ]_{\omega} \dots ]_{\phi}$$

(where the vowel V bears the main stress of the word)

Given (14), let us consider (15):

(15) a. Papá mangia

daddy eat.3sg

(Papá)<sub>ϕ</sub> (mangia)<sub>ϕ</sub>

‘Daddy is eating’

Ghini (1993: 43)

b. La veritá vince

the truth win.3sg

(La veritá)<sub>ϕ</sub> (vince)<sub>ϕ</sub>

‘The truth wins’

Ghini (1993: 43)

c. La solidarietà cresce

the solidarity grow.3sg

(The solidarietà)<sub>ϕ</sub> (cresce)<sub>ϕ</sub>

‘Solidarity is increasing’

Ghini (1993: 44)

- d. La cecitá puó essere guarita  
 the blindness can.3sg be cure.PP  
 (La ceritá)<sub>φ</sub> (puó essere guarita)<sub>φ</sub>  
 ‘Blindness can be cured’ Ghini (1993: 44)

In all of these examples, the subject ends in a stressed vowel, and the following word (verb or auxiliary verb) starts with a consonant which is followed by a non-nasal sonorant. However, Raddoppiamento Sintattico fails to apply, indicating that there is a phonological phrase boundary between the subject and the verb or the auxiliary verb.

Let us next consider the following examples:

- (16) a. Porterá due tigri fuori dalla gabbia  
 take.Fut.3sg. two tigers outside from.the cage  
 ‘He will take two tigers out of the cage’  
 Nespor and Vogel (1986: 173)
- b. Vaccineró tutte le scimmie entro due giorni  
 vaccinate.Fut.1sg. all the monkeys within two days  
 ‘I will vaccinate all the monkeys within two days.’  
 Nespor and Vogel (1986: 173)
- c. Venderá questo leopardo in dicembre  
 sell.Fut.3sg. this leopard in December  
 ‘He will sell this leopard in December’  
 Nespor and Vogel (1986: 173)







form a single p-phrase, the shortening of the vowel is accounted for since *kikólombe* occupies a non-final position in the p-phrase.

Now, let us consider the following example:

- (20) *kikóloombe*      *shaapúwaaniike*  
 shell                      broke  
 ‘The shell broke’                      (Odden 1990: 260)

Here, *kikóloombe* ‘shell’ is a subject, preceding the verb, and the long vowel *-oo-* is not shortened, indicating that there is a phonological phrase boundary between the subject and the verb.

Kimatuumbi has another phonological rule, *Phrasal Tone Insertion*, which is sensitive to phonological phrasing (Odden 1987, 1990, 1996).<sup>7</sup> Phrasal Tone Insertion inserts a floating H tone between p-phrases, and the H tone docks on to the last syllable of the preceding word (Odden 1990: 262). Consider the following:

- (21) a. Mambóondo  
           ‘Mamboondo’

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<sup>7</sup> Note that the domain of Shortening is different from that of Phrasal Tone Insertion in some environments. The domain of Shortening is properly contained in the domain of Phrasal Tone Insertion. However, since the presence of an inserted phrasal tone always corresponds to the right edge of the domain of Shortening, I use Phrasal Tone Insertion as a diagnostic of p-phrasing here. Truckenbrodt (1995, 1999) proposes that the difference in phrasing is accounted for in terms of recursive p-phrases. Seidl 2001 proposes that the difference is due to the restructuring of p-

- b. Mamboondó aawíle  
 ‘Mamboondo died’ Odden(1987: 21; 1990: 262)
- (22) a. kiyógoyo  
 ‘bird (type)’ Odden(1987: 21; 1990: 262)
- b. kiyógoyó chaatítuumbuká  
 ‘The bird has fallen’
- (23) a. mpúunga  
 ‘rice’
- b. mpúungá waabói  
 ‘the rice has rotted’ Odden (1987)

The (a)-examples in (21)-(23) show that the final vowels of *Mamboondo*, *kíyógoyo* and *mpúunga* are tone-less in isolation. In the (b)-examples, they occupy the subject position and the final vowels receive a H tone, indicating that there is a phonological phrase boundary between the subject and the verb. The same is true in the embedded clause:

- (24) ngwasa Mamboondó aatítuumbuká  
 I-think Mamboondo he-fell  
 ‘I think that Mamboondo fell’ (Odden 1990: 263)

Here, *Mamboondo* is the subject of the embedded clause, and receives a H tone on the final vowel.

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phrases and that Shortening applies before the restructuring applies, and Phrasal Tone Insertion applies after that.

Given the data of Shortening and Phrasal Tone Insertion, I conclude that the subject is not phrased with the verb in Kimatuumbi.

Let us next consider the object:<sup>8</sup>

- (25) a. naa-ki-twéetj  
 I-it-took  
 ‘I took it’
- b. naa-ki-twétj kikóloombe  
 I-it-took shell  
 ‘I took a cleaning shell’ Odden (1987: 16 (11))
- (26) a. naa-ká-laangite  
 ‘I fried’
- b. naa-ká-langite chóolyá  
 ‘I fried food’ Odden (1987: 16 (11))

(25a) and (26a) show that these verbs contain a long vowel in isolation. (25b) and (26b) show that the vowels are shortened, indicating that there is no phonological phrase boundary after the verb: The object and the verb are phrased together in Kimatuumbi.

Similarly, Shortening also applies to the verb in the embedded clause:

- (27) naansáidi [mwaana [ywáakalangitée ñáma ]<sub>S</sub> ]<sub>NP</sub>  
 I-him-help child Rel-fried meat  
 ‘I’ll help the child who fried the meat’ Odden (1987: 17)

Here,<sup>9</sup> *-aa-* of *kálaangite* ‘fried’ is shortened (cf. (26a)), indicating that there is no phonological phrase boundary between the verb and the object in the embedded clause.

Let us now consider whether Phrasal Tone Insertion applies between the verb and the object:

- (28) *tutanga ywaáwíjilé*  
       ‘we know the one who died’     Odden (1996: 239)
- (29) *aatwétij mpuungá noobúuka*  
       he-took rice           and-left     Odden (1996: 240)

Here, Phrasal Tone Insertion does not apply to the verbs *tutanga* and *aatwétij*. The final vowel of these verbs does not get a H tone. Therefore there is no phonological phrase boundary between the verbs and the object.

Odden (1996: 233-4) discusses another phonological rule in Kimatuumbi, *Perfect Tone Loss*. This rule deletes a H tone on the initial mora of the stem of the recent past perfective verb if something follows it within VP.

- (30) a. *akáatjite*  
       ‘he cut’

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<sup>8</sup> According to Odden (1987: 35, footnote 3), “Shortening applies only in the stem; surface long vowels in prefixes are not shortened (*viz. naa-*).”

b. akat̩ite kaámba

‘he cut rope’

Odden (1996: 233)

(30a) shows that the initial mora of the verb stem bears a H tone, and (30b) shows that the H tone is deleted due to the presence of the object. Note that Shortening also applies in (30b).

Perfect Tone Loss fails to apply in the following examples. The syntactic phrasing is Odden’s (1996: 234):

(31) a. [NP [S [VP ywaábak̩íye [S pánga [VP agakáat̩ité ]]]] aw̩íle  
 Rel-tell-me that he-them-cut he-died

‘The one who told me that he cut them died’

b. \*ywaábak̩íye pánga agakaat̩ité aw̩íle

(32) a. naankúmbwa [NP [S [VP ywaámbak̩íye [VP ugóonj̩ite ]]] maláau  
 I’ll beat Rel-tell you-sleep tomorrow

‘Tomorrow I’ll beat the one who told me you were sleeping’

b. \*naankúmbwa ywaámbak̩íye ugoonj̩ite maláau

The recent past perfective verbs *agakáat̩ité* ‘he-them-cut’ in (31a) and *ugóonj̩ite* ‘you-sleep’ in (32a) retain their H tones on their first mora of the stem even though they are followed by a word. (31b) and (32b) are bad since those H tones are deleted. These examples show that Perfect Tone Loss does not apply because of a mere presence of a word following

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<sup>9</sup> Note that the final vowel *-ée* of the verb is long, but this is due to another independent phonological rule *Lengthening*. See Odden 1987.

the verb. They show that Perfect Tone Loss is sensitive to the presence of a word within a local domain, i.e., the p-phrase. Therefore, (30) shows that the verb and the object belong to a single p-phrase.

So far, we have seen that the object is always phrased with the verb in Kimatuumbi. However, all the data I have discussed so far has a non-branching object. I have not found an example where a branching object is used in Odden's literature. Thus it is not clear whether non-branchingness is a requirement for inclusion in a larger p-phrase as it is in Italian. However, first, the phrasing of the verb with the (non-branching) object is not optional, unlike in Italian. Second, although Odden does not discuss branchingness, his data include the following, which suggests that even branching objects are phrased with the verb:<sup>10</sup>

- (33) a. *naamwéeni % kaapangá kaási*  
           'I saw him while he worked'           Odden (1996: 262)
- b. *naammwénii nchéngowe Malíya*  
           'I saw Mary's husband'               Odden (1996: 223)

Here, the relevant phonological rule is Shortening. In (33a), “%” indicates an Intonational Phrase boundary. Since the Intonational Phrase properly contains a p-phrase, the verb *naamwéeni* is in the p-phrase final position as well as the Intonational Phrase final position in (33a), and the long vowel *-ée-* retains its length. In (33b) which contains the same verb, the object *nchéngo* ‘husband’ accompanies a possessor *Malíya*.

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<sup>10</sup> Odden (1996:223) uses (33b) to show that *nchéngowé* ‘her husband’ undergoes Shortening because of the presence of *Malíya* ‘Mary.’



Assuming that they form a (syntactic) constituent, (33b) shows that even a branching object triggers Shortening of the long vowel of the verb. That is, a branching object is phonologically phrased with the verb. Note that *nchéngowe* and *Maliíya* also form a phonological constituent or p-phrase since the long vowel of *nchéngo* ‘husband’ is shortened.<sup>11</sup> That is, *nchéngowe* is not in a p-phrase final position.

Third, a branching benefactive argument in applicative constructions is phrased with the verb (cf. (26)):

- (34) a. *naan-kálaangiile*  
       ‘I fried for him’  
       b. *naan-kálangile Mambóondo*  
       ‘I fried for Mamboondo’  
       c. *naan-kálangile ywaápalá kálaanga*  
       ‘I fried for the one who wanted to fry’                      Odden (1996: 225)

(34a) shows that the verb has a long vowel *-aa-* in isolation. (34b) shows that the (non-branching) benefactive argument *Mambóondo* triggers Shortening on the verb. Thus the verb and the object form a p-phrase, in which the verb occupies a non-final position. (34c) shows that the (branching) benefactive phrase *ywaápalá kálaanga* ‘the one who wanted

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<sup>11</sup> The inalienable possessive-suffix *-we* added to *nchéngo* ‘husband’ does not trigger Shortening of *nchéngo*.

(i) a. *nchéngo*            ‘husband’  
       b. *nchéngowe*      ‘her husband’      Odden (1996: 222)

Here, irrespective of whether *-we* is added or not, the noun retains its long vowel. Therefore, *-ee-* is shortened in (33b) because of the possessor.

to fry' also triggers Shortening on the verb. Therefore, the branching object is phonologically phrased with the verb.

Given these considerations, I conclude that the object, whether branching or not, is always phrased with the verb in Kimatuumbi.

To summarize, Kimatuumbi shows the following phonological phrasing pattern:

(35) (S)<sub>φ</sub> (V O)<sub>φ</sub>

## 2.4 Kinyambo

Bickmore (1989, 1990) shows that Kinyambo<sup>12</sup> has a phonological rule that is sensitive to phonological phrasing. The rule is *High Deletion*, formulated in (36).

(36) High Deletion

$$H \rightarrow \emptyset / [ \dots [ \dots \_ \dots ]_{\omega 1} [ \dots H \dots ]_{\omega 2} \dots ]_{\phi}$$

( $\omega$  = word,  $\phi$  = phonological phrase)

Bickmore (1990: 9)

The H tone in a word  $\omega 1$  is deleted if there is another word  $\omega 2$  containing H after  $\omega 1$  within a p-phrase. The rule application is illustrated in (37):

(37) a. [ [ o-mu-káma]<sub>w</sub> [mu-kázi]<sub>w</sub> ] ]<sub>φ</sub>  
           chief                  old

---

<sup>12</sup> Kinyambo is also known as Runyambo. (Alsina 1994, Rugemalira 1993).

- b. o-mu-kama mu-kázi Bickmore (1990: 9)  
 chief old  
 ‘the old chief’

(37a) shows the underlying form where both *o-mu-káma* ‘chief’ and *mu-kázi* ‘old’ have a H tone. (37b) shows the H tone of *o-mu-káma* ‘chief’ is deleted since *mu-kázi* ‘old’ has a H tone.

Let us now consider the following examples:

- (38) a. abakózi  
 ‘workers’  
 b. bákajúna  
 ‘they help’  
 c. abakozi bákajúna  
 ‘the workers helped’ Bickmore (1990: 11)
- (39) a. omukáma  
 ‘chief’  
 b. nejákwiija  
 ‘will come’  
 c. omukama nejákwiija  
 ‘the chief will come’ Bickmore (1990: 11)

(38a) and (38b) show the words in isolation. Both words have a H tone. (38c) shows that the H tone of *abakózi* ‘workers,’ which is a subject, is deleted because of the following verb. (39) makes the same point. These

examples show that the subject and the verb are phonologically phrased together in Kinyambo:

(40) (S V)<sub>φ</sub>

However, if the subject is branching in the sense that it has two (or more) words in it, then the subject is not phrased with the verb.

(41) abakozi bakúru bákajúna  
workers mature they-helped

‘The mature workers helped’

Bickmore (1990:14)

Here, the H tone of *abakózi* ‘workers’ is deleted but that of *bakúru* ‘mature’ is not, indicating that there is a phonological phrase boundary after the subject phrase but that there is no boundary between *abakozi* and *bakúru* within the subject:

(42) (abakozi bakúru)<sub>φ</sub> (bákajúna)<sub>φ</sub>  
workers mature they-helped

Given this, I conclude that the subject is phrased with the verb if it is non-branching in Kinyambo.

(43) a. (S )<sub>φ</sub> (V)<sub>φ</sub>

b. (S V)<sub>φ</sub> if the subject is non-branching

Note that the branchingness of the verb is irrelevant here. In both cases, the verb is non-branching. Therefore, the difference in phrasing in (43) is solely due to the branchingness of the subject.

Let us next consider the object.

(44) a. okubón

see

b. ómuntu

person

b. okubon' ómuntu

'to see the person'

adapted from Bickmore (1989: 106)

(44a) and (44b) show the underlying forms of the words. (44c) shows that High Deletion deletes the H tone of the verb due to the presence of the non-branching object.<sup>13</sup> Therefore, the non-branching object is phonologically phrased with the verb.

Let us next consider the branching object. The following example has a branching Indirect Object in the double object construction:

(45) a. Nejákwórecha

'he will show'

---

<sup>13</sup> Bickmore (1989: 106) notes that in this example, High Deletion (or Beat Deletion in his (1989) terms) is "optional (but preferred), as one syllable intervenes between the clashing stresses." I assume that this is not due to the phonological phrasing, but due to the nature of the phonological rule.

b. omukáma

‘chief’

c. abakózi

‘workers’

d. émbwa

‘dog’

e. nejákwoch ómukama w’ábakózi émbwa

he-will-show chief of workers dog

‘He will show the chief of the workers the dog’

Bickmore (1990: 15)

(45a-d) show the words in isolation. (41e)<sup>14</sup> shows that the H on the verb is deleted by High Deletion due to the presence of the following branching object, indicating that there is no phonological phrase boundary between the verb and the branching object.<sup>15</sup>

<sup>14</sup> The H on the prefix in *omukama* is the result of the application of High Insertion. It is not deleted by High Deletion. See Bickmore (1989).

<sup>15</sup> The following example also shows that the (syntactically) branching object is phonologically phrased with the verb:

(i) Mbonir’ [émbw’ [ [ érire múnó]<sub>VP</sub> ]<sub>S</sub> ]<sub>NP</sub> Kénýa]<sub>NP</sub>  
 ( )<sub>φ</sub> ( )<sub>φ</sub>  
 I-saw dog Rel-ate well Kenya

‘I saw the dog who, while in Kenya, ate well.’ Bickmore (1990:16)

Here, the object is modified by the relative clause, and the verb does not have a H tone, indicating that there is no phonological phrase boundary between the verb and the object. According to (44a), the verb ‘see’ has a H tone in isolation. However, since I do not find the specific underlying representation of the verb form used in (i) in Bickmore (1989, 1990), I put this data here in footnote.

Given these considerations, I conclude that the object is phonologically phrased with the verb irrespective of the branchingness of the object.

To sum up, Kinyambo shows the following phonological phrasing:

- (46) a. (S)<sub>φ</sub> (V O)<sub>φ</sub>  
 b. (S V O)<sub>φ</sub> if the subject is non-branching

## 2.5 Summary

In this section, I have shown various phonological phrasing patterns, repeated here:

- (47) (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub> Anglo dialect of Ewe, French  
 (48) a. (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub> Italian  
 b. (S)<sub>φ</sub> (V O)<sub>φ</sub>  
 if the object is non-branching  
 (49) (S)<sub>φ</sub> (V O)<sub>φ</sub> Kimatuumbi  
 (50) a. (S)<sub>φ</sub> (V O)<sub>φ</sub> Kinyambo  
 b. (S V O)<sub>φ</sub>  
 if the subject is non-branching

In the next section, I give an account for the variation within the proposed theory of syntax-phonology mapping, where Spell-Out maps a phonological string to the phonological component  $\Phi$ . I argue that the observed variation is accounted for in terms of the structural difference and the applicability of the restructuring of p-phrases.

### 3. A Proposed Account

In this section, I account for the phrasing pattern observed in the previous section within the proposed theory of syntax-phonology mapping. I show that the cross-linguistic variation results from the following two factors. One is phonological. Since the syntactic information available to  $\Phi$  is at a bare minimum in this theory, the restructuring of phonological phrase should be induced for purely phonological reasons. The other is structural. Since the phonological string mapped to  $\Phi$  varies due to syntactic movement, the phonological phrasing reflects the syntactic structure or the cyclic application of Spell-Out.

In what follows, I first discuss the previous theories of branchingness and restructuring, then give an account for the phrasing pattern within the proposed theory.

#### 3.1 Previous Accounts

##### 3.1.1 Branchingness in Relation-based Theory

Nespor and Vogel (1986) propose the following rule on phonological phrasing (repeated here from Chapter 1):

(51)  *$\phi$  restructuring* (optional) (Nespor and Vogel 1986: 173)

A nonbranching  $\phi$  which is the first complement of X on its recursive side is joined into the  $\phi$  that contains X.

As Nespor and Vogel (1986: 173) explicitly state, this is a syntactic condition. Thus, “nonbranching” is a syntactic notion. It also refers to syntactic notions “complement” and “recursive side.”



As Inkelas and Zec (1995: 536-537) point out, the access to syntactic information should be restricted to a minimum in a sufficiently constrained theory of phonological phrasing. From this perspective, (51) would not be very desirable since it refers to at least three syntactic notions: “branchingness,” “complement,” and “recursive side.”<sup>16</sup>

Empirically, (51) accounts for a wide range of data. Suppose that (51) is taken to be a parameter (Nespor and Vogel 1986: 6.4). Thus, if (51) is on, it accounts for the optionality in phrasing in Italian (48). If it is off, then there are two possibilities. One is that restructuring is forbidden. This accounts for the phrasing in the Aɲlɔ dialect of Ewe and colloquial French where the object is never phrased with the verb (Nespor and Vogel 1986: 179-180). The other possibility is that restructuring is obligatory. Then it accounts for the phrasing in Kimatuumbi, where the object is always phrased with the verb (see Nespor and Vogel 1986: 180 for Chimwi:ni). However, it does not account for the phrasing pattern in Kinyambo (50), where the non-branching subject restructures into the following p-phrase, since the subject is not a complement of the verb.

### **3.1.2 Branchingness in Edge-based Theory**

Within the Edge-based theory of Selkirk (1986), Cowper and Rice (1987:192) propose a parameter of branchingness for p-phrase formation (see also Bickmore 1990). Their formulation is roughly the following:

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<sup>16</sup> Note that the “recursive side” can be decomposed into two syntactic notions: “recursivity,” which is independent of the head parameter, and

- (52) a. The {left/right} edge of XP corresponds to the {left/right} edge of a p-phrase.  
 b. XP is (syntactically) branching.

In the language where (52b) is on, the left or right edge of non-branching XP is invisible to (52a). In the language where (52b) is off, the left or right edge of XP is always visible to (52a) whether XP is branching or not.

This formulation refers to two syntactic notions: a maximal projection XP and branchingness of syntactic trees.

It is not clear how the parameter in (52b) accounts for the contrast between (48a) and (50), repeated here:

- (48) a. (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub>                      Italian  
 b. (S)<sub>φ</sub> (V    O)<sub>φ</sub>  
       if the object is non-branching
- (50) a. (S)<sub>φ</sub> (V    O)<sub>φ</sub>                      Kinyambo  
 b. (S    V    O)<sub>φ</sub>  
       if the subject is non-branching

In (48), only the object is sensitive to the branchingness, while in (50) only the subject is sensitive to it. Note that Nespor and Vogel (1986) do not have this problem since their formulation (51) makes a reference to “complement.”

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“side,” which is part of head parameter in that it reflects the directionality defined by head parameter.

In the next section, I propose a theory that does not refer to syntactic information.

### 3.2 Prosodic Branchingness

Inkelas and Zec (1995:544) propose the following constraint on phonological phrasing:

(53) [ ω ω ]<sub>φ</sub>

(53) says that “a preferred phonological phrase is one which consists of at least two phonological words” (Inkelas and Zec 1995:544). This constraint is purely phonological (or prosodic) in that it does not refer to any syntactic information, such as maximal projection, complement, recursive side, syntactic branching, etc. Therefore, I adopt this constraint to account for the restructuring of phonological phrasing. I will propose that (53) is parameterized, so that it is respected in some languages while it is not in the others. I also propose that if (53) is respected, the direction of the restructuring is parameterized so that it applies to the left or right.

### 3.3 Italian

In this section, I give an account for the phrasing pattern in Italian, repeated here:

(48) a. (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub>

b. (S)<sub>φ</sub> (V O)<sub>φ</sub>

if the object is non-branching

Let us first consider the syntactic position of the verb. Since Italian shows the syntactic properties similar to French, I discuss the relevant aspects of syntax of Italian and French here. In French, VP adverbs show up between the verb and the object (Pollock 1989: 367):

- (54) a. Jean embrasse souvent Marie  
           Jean kisses   often   Maie  
       b. \*Jean souvent embrasse Marie  
           Jean often   kisses   Mary

Also, the verb precedes the negation *pas* in French:

- (55) Jean (n') aime pas Marie  
       Jean     likes not Marie

Similarly in Italian, the verb precedes a negative adverb (*più, mai, ancora*) which optionally cooccurs with the negative clitic *non* (Belletti 1994: 21):

- (56) Gianni non parla (più/mai/ancora)  
       \*Gianni non più/mai/ancora parla                   (Belletti 1994: 20)

Following Pollock (1989) and Belletti (1994), I assume that the verb moves to Infl over the negation *pas* and *più/mai/ancora* in these languages.

(57) The verb is in Infl in French and Italian.

Note that if there is an auxiliary verb, then the verb stays in *v*. Thus, the adverb follows the auxiliary verb, and precedes the verb:

- (58) a. Jean a toujours complètement perdu la tête pour elle  
 Jean has always completely lost his mind for her  
 (French: Cinque 1999: 7)
- b. Gianni ha sempre completamente perso la testa per lei  
 Gianni has always completely lost his mind for her  
 (Italian: Cinque 1999: 7)

In these examples, the auxiliary verb is in Infl, and the verb is in *v*.

Let us next consider the position of the object. Ogawa (2001: 261) argues that the object remains in the base position in Italian and French, by showing that the adverb may appear between the verb and the object.

In French, the VP-adverbs may follow the verb and precede the object:

- (59) a. Oublier presque son nom, ça n'arrive pas fréquemment.  
 'To forget almost one's name ...' (French: Pollock 1989: 378)
- b. Parler à peine l'italien après cinq ans d'étude dénote un manque de don pour les langues.  
 'To speak hardly Italian ...' (French: Pollock 1989: 378)



that doctor will solve your problem completely

Belletti (1990: 61)

b. Quel medico risolverà i tuoi problemi *spesso*

that doctor will solve your problem often

Belletti (1990:61)

Then it would be the case that the object moves to the Spec of *v*P over the adverb that is adjoined to VP. However, those adverbs occur after the past participial verb in the complex tense:

(63) a. Quel dottore ha risolto *spesso* i tuoi problemi

that doctor has solved often your problems

Belletti (1990: 66)

b. Quel dottore ha risolto *completamente* i tuoi problemi

that doctor has solved completely your problem

Belletti (1990: 66)

Assuming that the past participial verb is in *v*, the adverbs in (63) should be adjoined to VP:

(64) ... AUX-Infl [<sub>VP</sub> V-*v* [<sub>VP</sub> ADV [<sub>VP</sub> <V> ... ]]]

Note that the adverbs like *spesso* ‘often’ may not appear between the auxiliary verb and the past participial verb:

(65) \*? (A quella riunione) Gianni ha spesso parlato

at that meeting Gianni has often talked

Belletti (1990: 67)

In contrast, the adverbs like *completamente* ‘completely’ may appear between the auxiliary verb and the past participial verb:

- (66) (In quelle circostanze) Gianni ha completamente sbagliato  
 in those circumstances Gianni has completely mistaken

Belletti (1990: 67)

Belletti (1990: 67) argues that the adverbs like *completamente* may adjoin either to the VP or to a functional projection higher than VP. I assume that such adverbs may adjoin either to VP or vP.

- (67) ... AUX-Infl [<sub>vP</sub> (ADV) [<sub>vP</sub> V-v [<sub>VP</sub> (ADV) [<sub>VP</sub> <V> ... ]]]

Thus the participial verb *sbagliato* is in *v*, the auxiliary verb *ha* is in Infl, and the adverb *completamente* is adjoined to vP in (66), while the same adverb is adjoined to VP in (63b).

Then, the contrast between (63a) and (65) is due to the fact that the adverb *spesso* ‘often’ is adjoined to VP, but not vP:

- (68) ... AUX-Infl [<sub>vP</sub> V-v [<sub>VP</sub> ADV [<sub>VP</sub> <V> ... ]]]

(65) is ungrammatical because the adverb *spesso* ‘often,’ which is adjoined to VP, precedes the participial verb that is supposed to be in *v*.



Given these facts, I assume that the adverb *spesso* ‘often’ is adjoined to VP in Italian. Then, the fact that the adverb *spesso* ‘often’ follows the object in (62b) should not be taken to be a result of the movement of the object into the Spec of  $vP$  over the adverb since, as (63a) shows, the object occurs after the participial verb in  $v$ , indicating that it does not move to the Spec of  $vP$ . If it may move to the Spec of  $vP$ , it would be predicted that the object may precedes the participial verb. Therefore, following Belletti (1990: 61), I assume that the adverb is adjoined to the right of the VP in (62).

So far I have argued that the adverb *spesso* ‘often’ is adjoined to VP in Italian. Now, the fact that the object follows the adverb *spesso* ‘often’ in (61b) is accounted for by assuming that the object stays in situ, i.e., within VP:

(69) ... [<sub>VP</sub> ADV [<sub>VP</sub> <V> Obj ]]

Therefore, I assume that the object stays in the original position in Italian.

Given these, I assume that the  $v$  in French and Italian does not have an OCC feature (Ogawa (2001)), and the object stays in its original position:

(70)  $v$  does not have an OCC feature in French and Italian.

I will return to the position of the subject later. Tentatively, I assume that the subject is in the Spec of IP in French and Italian.

Given these syntactic assumptions, let us consider the phonological phrasing in Italian. I assume that the parameter (53) is on in Italian:

(71) A p-phrase contains two or more phonological words in Italian.

Note that (71) is not inviolable. Thus, if there is a situation in which (71) cannot be satisfied, a p-phrase containing just one phonological word is allowed. However, under certain conditions that will be clarified shortly, the restructuring of the phonological phrasing may take place so that a p-phrase violating (71) is restructured into the adjacent p-phrase. Thus, as in (72) below, if a p-phrase containing X or Y violates (71), it restructures into the adjacent p-phrase (I am putting aside the directionality here):

(72)  $(Y)_\phi (X)_\phi \rightarrow (Y X)_\phi$

Now, let us consider the derivation in detail. Let us first consider the example (16c), repeated in (73), where the object branches.

(73) Venderá            questo leopardo    in dicembre  
 sell.Fut.3sg.    this leopard    in December  
 (                    )<sub>ϕ</sub> (                    )<sub>ϕ</sub> (                    )<sub>ϕ</sub>  
 ‘He will sell this leopard in December’

Nespor and Vogel (1986: 173)

According to Nespor and Vogel (1986:172-3), Raddoppiamento Sintattico does not apply to the initial consonant *q-* of *questo*, indicating that there is a phonological phrase boundary between the verb and the object. For expository purposes, I ignore the modifier *in dicembre* ‘in December’ here.

Suppose that the syntactic derivation reached the following stage:

(74) [<sub>VP</sub> see-*v* [<sub>VP</sub> <see> this leopard ]]

Here, the object stays in situ, and the verb ‘see’ moves to adjoin to *v* (recall that the notation <see> roughly corresponds to a trace of ‘see’).

Suppose that the sister of *v* is Spelled-Out at this stage of derivation.

(75) Spell-Out(Sister of *v*):

- a. Linear Order: <see> this leopard
- b. Mapping to  $\Phi$ : this leopard

Here Linear Order is defined as in (75a), and it is mapped to  $\Phi$  as in (75b).

Note that <see> is not mapped to  $\Phi$  at this point since it is the initial element in (75a), as proposed in Chapter 1.<sup>17</sup>

Given the assumption that the string mapped to  $\Phi$  corresponds to a p-phrase, the string ‘this leopard’ in (75b) corresponds to a p-phrase. Now, this string is evaluated against the prosodic branching condition (53)/(71). Since it includes two phonological words, it satisfies (71):

(76) (this leopard) <sub>$\phi$</sub>

Suppose that the syntactic derivation reached the following stage:<sup>18</sup>

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<sup>17</sup> The verb movement takes place in PF (Chomsky 1995: 368) so that the “trace” of the verb is visible to the linearization and it counts as the initial element here.

(77) [<sub>CP</sub> C [<sub>IP</sub> pro see-*v*-Infl [<sub>vP</sub> <see-*v*> [<sub>VP</sub> <see> this leopard ]]]]

Here, I am assuming that the *v* to which ‘see’ is adjoined moves up to adjoin to Infl (see (57)). Suppose that the sister of C is Spelled-Out:

(78) Spell-Out(Sister of C):

- a. Linear Order: pro see-*v*-Infl <see-*v*> <see>
- b. Mapping to  $\Phi$ : see

Linearization defines linear order as in (78a), and it is mapped to  $\Phi$  as in (78b). I assume that mapping to  $\Phi$  does not involve phonologically empty elements. Therefore only ‘see’ is mapped to  $\Phi$ . This string corresponds to a p-phrase:

(79) (see) <sub>$\phi$</sub>  (this leopard) <sub>$\phi$</sub>

Now, the p-phrase (see) <sub>$\phi$</sub>  is evaluated against the prosodic branching condition (71). It violates it since it contains only one phonological word. However, as the data in (73) suggests, it must not restructure into the following p-phrase.

Note that the phonological computation and the syntactic computation are performed in parallel within the Multiple Spell-Out theory (cf. Chomsky 2001b: 4). In other words, the phonological computation is performed as the Spell-Out maps the phonological string from the narrow

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<sup>18</sup> I omit the *vP*-internal subject and its movement to the Spec of Infl.

syntax to the phonological component  $\Phi$ . Suppose that the restructuring of the phonological phrasing is to apply as the syntactic derivation goes on. Then it is necessary to assume that the phonological string  $X$  mapped to  $\Phi$  by the previous Spell-Out is still accessible to  $\Phi$  when the next phonological string  $Y$  is mapped to by the current Spell-Out.

- (80) a. Spell-Out  $\rightarrow (X)_\phi$   
 b. Spell-Out  $\rightarrow (Y)_\phi (X)_\phi$   
 c. Restructuring:  $(Y)_\phi (X)_\phi \rightarrow (Y X)_\phi$

Here, the p-phrase containing  $X$  has to be accessible at the point of (80b) if it undergoes the restructuring as in (80c). I assume that the p-phrase containing  $X$  is evaluated against the prosodic branching condition at the point of (80a). If it violates it, and if there is no adjacent p-phrase to which it may restructure, it remains to be a “potential” p-phrase to which phonological rules may not apply yet. If the restructuring applies later in the derivation as in (80c), the p-phrase containing  $X$  and  $Y$  is formed, which satisfies the prosodic branching condition, and phonological rules apply within the p-phrase. I call such a p-phrase in which phonological rules may apply a “real” p-phrase.

Under these considerations, there are at least two logically possible ways to block the restructuring in (79). One is to adopt the following condition:<sup>19</sup>

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<sup>19</sup> As Draga Zec (personal communication) pointed out to me, (81) is similar to the Free Element Condition proposed by Prince (1985: 479):  
 (i) Free Element Condition: Rules of primary metrical analysis apply only

(81) A “real” p-phrase may not be modified.

According to this condition, (this leopard)<sub>φ</sub> cannot be modified later in the derivation since it has already satisfied the prosodic branching condition and it is not a “potential” p-phrase any more. Therefore, even though (see)<sub>φ</sub> does not satisfy (71), it may not restructure into (this leopard)<sub>φ</sub>, as expected. Under this condition, restructuring is impossible as a reflex of bottom-up syntactic derivation.

The other possible condition is as follows:

(82) Restructuring is always to the left.

Since directionality is one of the primitive notions in  $\Phi$  and the sensorimotor system, (82) is a valid formulation. Under (82), (see)<sub>φ</sub> cannot restructure into (this leopard)<sub>φ</sub> in (79) since the restructuring would be to the right.

In section 3.6 below, I will show that (81), though attractive, does not account for the Kinayambo data. I will argue that the parameterized version of (82) accounts for those data. That is, the restructuring is to the right in Kinyambo. Therefore I adopt (82) here.<sup>20</sup>

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to Free Elements -- those that do not stand in the metrical relationship being established; i.e. they are “feature-filling” only.

<sup>20</sup> Note that (81) is theoretically superior to (82) in that it does not require any directionality. In Chapter 5, I provide a possible account of Kinyambo data under (81).

Under (82), the p-phrase containing ‘see’ in (79) does not undergo restructuring. Since the prosodic branching condition is a preference condition, it may be violated. For the derivation of (79), no other element is mapped to the phonological component, and a potential p-phrase containing only ‘see’ becomes a “real” p-phrase without restructuring.

Now, let us consider the non-branching object in Italian. If the object is non-branching or consists of one word, Raddoppiamento Sintattico applies optionally to the initial consonant of the object. This optionality is due to the difference in phonological phrasing:

- (83) Se prenderá qualcosa prenderá tordi = (18)  
 if catch.Fut.3sg. something catch.Fut.3sg. thrushes  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>

‘If he catches something, he will catch thrushes.’

Nespor and Vogel (1986:172)

Suppose that the syntactic derivation for ‘catch something’ reached the following stage of the derivation:

- (84) [<sub>vP</sub> catch-*v* [<sub>vP</sub> <catch> something ]]

Suppose that the sister of *v* is Spelled-Out:

- (85) Spell-Out (Sister of *v*)  
 a. Linear Order: <catch> something  
 b. Mapping to Φ: something

Here, only ‘something’ is mapped to  $\Phi$ , and the following “potential” p-phrase is formed:

(86) (something) <sub>$\phi$</sub>

This is evaluated against the prosodic branching condition. It violates it since it contains only one phonological word. Note that Raddoppiamento Sintattico applies optionally. As I discussed before (section 2.2), the optionality is due to the difference in phonological phrasing. Therefore, whether (86) undergoes the restructuring or not should be decided at some point of the derivation. I suggest that it is decided at this point of the derivation. Thus, if (86) becomes a real p-phrase at this point, it may not undergo the restructuring later in the derivation. If it does not, it has to undergo the restructuring at the next stage of the derivation.

Suppose that the syntactic derivation reached the following stage:

(87) [<sub>CP</sub> C [<sub>IP</sub> pro catch-*v*-Infl [<sub>VP</sub> <catch-*v*> [<sub>VP</sub> <catch> something ]]]]

Spell-Out applies to the sister of C:

(88) Spell-Out (Sister of C)

- a. Linear Order: pro catch-*v*-Infl <catch-*v*> <catch>
- b. Mapping to  $\Phi$ : catch

(88b) corresponds to a potential p-phrase:



(89) (catch)<sub>φ</sub> (something)<sub>φ</sub>

First, (catch)<sub>φ</sub> is evaluated against the prosodic branching condition. It violates it since it consists of only one phonological word. However, under (82), it may not restructure into (something)<sub>φ</sub> since the restructuring would be to the right. However, the p-phrase (something)<sub>φ</sub> formed at the previous Spell-Out still violates the prosodic branching condition. If it has already become a real p-phrase, then it does not undergo restructuring, and ‘catch’ and ‘something’ are phrased separately. If the p-phrase containing ‘something’ has not become a real p-phrase at the previous step of derivation, then it undergoes restructuring to the preceding p-phrase at this point:

(90) (catch something)<sub>φ</sub>

Since (90) satisfies the prosodic branching condition, it becomes a real p-phrase at this point. Within this p-phrase, Raddoppiamento Sintattico applies. Note that this restructuring applies due to the non-branchingness of the object but not due to the non-branchingness of the verb.

Let us consider the phrasing of the subject. As shown in (48), repeated here, the subject never undergoes restructuring.

(48) a. (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub>  
 b. (S)<sub>φ</sub> (V O)<sub>φ</sub> if the object is non-branching

In the proposed theory of syntax-phonology mapping (see Chapter 1), the subject is mapped to  $\Phi$  independently of the verb adjoined to Infl since it is the initial element in the domain of the Spell-Out of the sister of C.

(91) [<sub>CP</sub> C [<sub>IP</sub> Subj V-*v*-Infl [<sub>VP</sub> <V-*v*> [<sub>VP</sub> <V> Obj ]]]]

(92) Spell-Out (Sister of C)

- a. Linear Order: Subj V-*v*-Infl <V-*v*> <V>
- b. Mapping to  $\Phi$ : V

(93) Spell-Out (Rest of the Structure)

- a. Linear Order: C Subj
- b. Mapping to  $\Phi$ : Subj

Subj escapes the mapping to  $\Phi$  in (92), and it is mapped to  $\Phi$  later, as in (93).

Now suppose that the subject is non-branching (i.e., it does not satisfy the prosodic branching condition). Then it may not restructure into the following p-phrase under (82) since such restructuring would be to the right. However, if the VP is non-branching, then we have the following p-phrasing when the subject is mapped to a potential p-phrase:

(94) (S) <sub>$\Phi$</sub>  (V) <sub>$\Phi$</sub>

At this point,  $(V)_\phi$  does not satisfy the prosodic branching condition, and it could restructure to the left, resulting in  $(S\ V)_\phi$ . However, this is not allowed in Italian (See (15)).

John Whitman (personal communication) pointed out to me that the subject is usually interpreted as a topic in the languages that allow *pro*-drop. Alexiadou and Anagnostopoulou (1998) argue that, based on the adverb placement, the pre-verbal subject in null-subject languages occupies an A-bar position, which is outside of the IP (pp.501-4), and that it shows scopal ambiguity if it is a quantificational element, indicating that it is in an A-bar position (pp.504-511). Therefore, I assume that the (pre-verbal) subject does not occupy the Spec of IP in Italian, but it is topicalized.<sup>21</sup> Frascarelli 2000 shows that in Italian a topic is always mapped to an Intonational Phrase, which properly contains a p-phrase under the Strict Layer Hypothesis (See Chapter 4 for some detailed discussion on topichood and phonological phrasing in Italian and Chichewa). If so, a p-phrase containing only a verb may not restructure into a p-phrase containing a subject because of the topichood of the subject.

If this is the case, it is predicted that a p-phrase containing only a verb may be restructured into a p-phrase containing a subject in the languages which have the prosodic branching constraint, and which do not allow *pro*-drop.

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<sup>21</sup> Note that the position of the subject in null-subject languages is controversial. Cf. Suñer (2001), who argues that the subject in null-subject languages in fact occupies the Spec of IP. See also Cardinaletti (1997) and Cinque (1995), among many others.



boundary between the subject and verb. That is, non-branching p-phrase containing only the verb may restructure to the one containing the subject in English. As I pointed out in section 3.1.1, Nespor and Vogel (1986) accounts for the fact that the non-branching p-phrase containing only the verb does not restructure into a p-phrase containing the subject by referring to a purely syntactic notion, complement:  $X$  may restructure into  $Y$  if  $X$  is a complement of  $Y$ . However, such an account is theoretically implausible because of the reference to the syntactic information. Also, it does not account for the English data shown in (96) where a p-phrase containing only the verb restructures into the one containing the (non-branching) subject. It does not account for the Kinyambo data where the non-branching subject restructures to the verb either (see section 2.4 and 3.6). Given these considerations, I assume that the p-phrase containing only the verb may not restructure to the one containing the subject in Italian (see (94)) for independent reasons, i.e., topichood.

### 3.4 Anlo dialect of Ewe and French

In this section, I give an account for phrasing pattern (47) observed in Anlo dialect of Ewe and colloquial French:

(47) (S)<sub>φ</sub> (V)<sub>φ</sub> (O)<sub>φ</sub>

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containing the verb to the one containing the subject are optional. Thanks

Here, S and O may or may not be branching. I assume that the parameter (53), repeated below, is off in these languages.

(53) [  $\omega$   $\omega$  ] <sub>$\phi$</sub>

Thus, the p-phrase containing only one prosodic word is legitimate in these languages. Then, there is no need to apply restructuring in these languages. That is, the “potential” p-phrases always correspond to the “real” p-phrases. Since the theory proposed in Chapter 1 generates the potential p-phrasing shown in (47), the ‘real’ phonological phrasing in these languages is the same as (47) (see section 3.3 for the syntactic assumptions of French, and section 3.6 for the syntactic assumptions of Ewe).

Note that in the French data (9) and (10), the relevant NPs have a head noun and a determiner. That is, they are syntactically branching. However, the relevant branchingness is prosodic one. As is well known, the function words such as a determiner do not count as a phonological word (Selkirk 1986, 1995). Therefore, the subject in (9) and the object in (10) are prosodically non-branching.

Note also that neither Ewe nor French allows *pro*-drop (Chris Collins personal communication, Clements 1973; Haegeman 1994: 456). That is, unlike Italian, the fact that the subject is phrased alone in these languages seems to reflect the mapping algorithm proposed in Chapter 1, rather than topichood as discussed in section 3.3.<sup>23</sup>

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to John Bowers and Bruce Morén for extensive discussion on these data.

<sup>23</sup> Note that Clements (1978: 62) observes the following data in Ewe:

### 3.5 Kimatuumbi

In this section, I give an account for the phrasing pattern observed in Kimatuumbi where V and O are phrased together:

(97) (S)<sub>φ</sub> (V O)<sub>φ</sub>

Note that the object is always phrased with the verb even if it is branching, unlike Italian.

As I will discuss in detail in Chapter 4, the Object Marker in the verbal morphology is interpreted as an incorporated pronoun in some Bantu languages such as Chichewa and KiYaka (see Bresnam and Mchombo, and Kidima 1991). Bresnan and Mchombo (1987) argue that in Chichewa if the object NP cooccurs with the Object Marker, it is interpreted as a topic which is anaphorically linked to the Object Marker. They argue that the topic NP is generated under S in the sentence structure [<sub>S</sub> NP VP].

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(i) wó má-ā-dzó ò  
 they Neg-T-leave Neg  
 ‘They will not leave’

There is a H-M-H sequence in the verbal morphology, but M-raising does not apply, indicating that there is a phonological phrase boundary there. If the negative *má-* is in NegP generated between IP and vP, it would be predicted that *má-ā-dzó* is mapped to  $\Phi$  together by Spell-Out, and M-raising would apply. However, it is not clear whether such a syntactic analysis is on the right track or not since the negation is expressed by the discontinuous negative morpheme *me ... o* here. I leave the syntactic analysis of the discontinuous negation and the phonological phrasing open for future research. See Clements (1978) for more interesting cases, which are beyond the scope of this study.

Therefore, if both the subject and the object are topics, then the word order is free in transitive constructions:

- (98) a. njûchi zi-ná-wá-lum-a alenje (Chichewa)  
       bees SM-Past-OM-bite-Ind hunters  
       ‘The bees bit them, the hunters.’  
       b. zináwáluma alenje njûchi  
       c. alenje zináwáluma njûchi  
       d. zináwáluma njûchi alenje  
       e. njûchi alenje zináwáluma  
       f. alenje njûchi zináwáluma Bresnan and Mchombo (1987: 747)

In contrast, if the verb does not bear the Object Marker, the object NP is not interpreted as a topic. It must follow the verb:

- (99) a. njûchi zi-ná-lúm-a alenje (Chichewa)  
       bees SM-Past-bite-Ind hunters  
       ‘The bees bit the hunter.’  
       b. zinálúma alenje njûchi  
       c.\* alenje zinálúma njûchi  
       d. \* zinálúma njûchi alenje  
       e. \*njûchi alenje zináluma  
       f. \*alenje njûchi zináluma Bresnan and Mchombo (1987: 744-5)



In (99a) and (99b), the object immediately follows the verb in the absence of the Object Marker. ((99b) is allowed if the subject is a topic generated under S). No other word order is allowed, as in (99c-f).

Moreover, Bresnan and Mchombo argue that a topic NP is phonologically phrased alone. In Chichewa, H tone on the final vowel of the verb is retracted to the penultimate if no other element follows it within a phonological phrase that corresponds to VP (See also Bresnan and Kanerva 1989, Kanerva 1990). Thus in (98a, b), the H tone on the verb stem is retracted to the preceding syllable even though the object NP immediately follows the verb, indicating that the verb and the object are phonologically phrased separately. In contrast, the H tone on the verb stem is not retracted in (99a, b), indicating that the verb and the object are phonologically phrased together.

In Chapter 4, I argue that the incorporation of the Object Marker as in (98) is triggered by the OCC feature on *v*. Then, if there is no Object Marker in the verbal morphology, the OCC feature of *v* has to be checked by the object NP. Therefore, the object NP in (99) occupies the Spec of *v*P. Assuming that the verb moves to Infl in Bantu languages (see Kinyalolo 1991 on Kilega, Baker 2003 on Kinande. See also Demuth and Harford 1999.), the verb in Infl and the object NP in the Spec of *v*P are mapped to the phonological component together in the proposed theory of syntax-phonology mapping. Then, the fact that the verb and the object are phonologically phrased together in the absence of the Object Marker in (99) is readily accounted for. Note that even the branching object is

phonologically phrased with the verb in Chichewa, like Kimatuumbi, as I will discuss in Chapter 4.

Now, let us consider Kimatuumbi. In Kimatuumbi, the object can be topicalized to the sentence initial position:

- (100) a. Ndaála aapákij̄ mmutúka  
 Ndaala he-packed car  
 ‘Ndaala packed the car’  
 b. mmutúka aapáki Ndaála  
 car he-packed Ndaala (Odden 1996: 75)

In (100b), the subject ‘Ndaala’ is focused and occupies the post-verbal position, and the object ‘car’ is topicalized to the sentence initial position. Note that the verb does not bear the Object Marker, unlike Chichewa. That is, the Object Marker is not an incorporated pronoun in Kimatuumbi. However, the Object Marker may show up when the object is topicalized:<sup>24</sup>

- (101) a. Mamboondó naa-m-mwéeni  
 Mamboondo I-him-saw  
 ‘I saw Mamboondo’ (Odden 1996: 237)

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<sup>24</sup> The morphological boundaries and the glosses in (101) and (102) are given by YD.



speakers, in addition to these two uses, the same form is also interpreted as the remote perfective with the Object Marker “we saw them” which is derived from /tu-a-ba-bwéeni/ by reducing the Object marker *-ba-*.

However, it is clear that the Object Markers in Kimatuumbi are different from those in Chichewa in that they are not (at least, exclusively) used as incorporated pronouns in Kimatuumbi. Given these facts, I (tentatively) assume here that the Object Marker in Kimatuumbi is grammatical agreement when they cooccur with the object NP, unlike Chichewa. More specifically, I assume that the Object Marker shows up optionally as a result of the checking of the phi-features of *v* against the object NP.

Collins (2003b) proposes that Agree gives rise to movement in Bantu (See Chapter 4 for discussion). Thus, if *v* agrees with the object, then the object moves to the Spec of *v*P. Along these lines, I assume that *v* has an OCC feature in Kimatuumbi (see Seidl 2001: 93-94. Cf. McGinnis 2001. and Ura 2000: 45ff.).

(103) *v* has an OCC feature in Kimatuumbi.

Under (103), the object moves to the Spec of *v*P to check the OCC feature of *v*. I also assume that the verb moves to Infl in Kimatuumbi (cf. Kinyalolo 1991:35ff. on Kilage, and Baker 2003 on Kinande).

Suppose that the syntactic derivation reached the following stage.

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(102a), inanimate object that does not undergo topicalization may cooccur with the Object Marker. Cf. Keach 1995.

(104) [<sub>vP</sub> V-*v* [<sub>vP</sub> <V> Obj ]]

Here V has moved to *v* (on the way to Infl). Since *v* has an OCC feature, the object moves to the Spec of *v*P:

(105) [<sub>vP</sub> Obj V-*v* [<sub>vP</sub> <V> <Obj> ]]

Suppose that Spell-Out applies to the sister of *v*. Since V and Obj have moved out of the sister of *v*, this Spell-Out is phonologically vacuous and no p-phrase is formed.

Suppose that the syntactic derivation reached the following stage:

(106) [<sub>CP</sub> C [<sub>IP</sub> Subj V-*v*-Infl [<sub>vP</sub> Obj <V-*v*> [<sub>vP</sub> <V> <Obj> ]]]]

At this point, the sister of C is spelled-out:

(107) Spell-Out (Sister of C):

- a. Linear Order: Subj V-*v*-Infl Obj <V-*v*> <V>
- b. Mapping to  $\Phi$ : V-*v*-Infl Obj

Subj escapes the mapping in (107b) since it is the initial element in (107a). The string mapped to  $\Phi$  in (107b) corresponds to a potential p-phrase:

(108) (V O) <sub>$\phi$</sub>

Suppose that the rest of the structure is spelled-out:

(109) Spell-Out (Rest)

- a. Linear Order: C Subj
- b. Mapping to  $\Phi$ : Subj

At this point, the subject corresponds to the potential p-phrase since it is the string mapped to  $\Phi$  in (109b):

(110) (S) <sub>$\phi$</sub>  (V O) <sub>$\phi$</sub>

I suggest that the prosodic branching condition is not operative in this language. Then (110) is the ‘real’ phonological phrasing, as expected. Note that unlike Italian, the p-phrase containing the verb and object does not result from restructuring. The phrasing is determined structurally: The verb and object are mapped to the phonological component together, and phrased together. Since the phrasing is determined structurally, rather than phonologically, the branchingness of the object is irrelevant to the phonological phrasing in Kimatuumbi, as we have seen in section 2.3.

Note that many Bantu languages show the phonological phrasing similar to Kimatuumbi in that the verb and the object are phrased together (see Bickmore 1989, 1990 on Kinyambo, Bresnan and Mchombo 1987 and Chapter 4 of this thesis on Chichewa, Hyman, Katamba, and Walusimbi 1987 on Luganda, Kisseberth and Abasheikh 1974 on Chi-Mw:ni, McHugh 1999 on the Vunjo dialect of KiChaga. See also McGiniss 2001 and Seidl 2001.). As Chris Collins (personal communication) pointed out to me, since the Bantu languages are

remarkably similar syntactically (noun classes, verbal morphology, post-nominal adjectives, etc.), the proposed theory predicts that they should show basically the same phonological phrasing. If the object moves to the Spec of *v*P in Bantu languages in general as I propose for Kimatuumbi and Chichewa, it is predicted that the verb and the object are phonologically phrased together since they are mapped to the phonological component together.

The proposed analysis makes an interesting prediction. Suppose that a language L allows optional movement of the object to the Spec of *v*P. Suppose also that the prosodic branching condition is not operative in L. Then, it is predicted that the object is phrased with V only when it is moved to the Spec of *v*P. In the next section, I show that the Anlo dialect of Ewe is this type of language.

### 3.6 More on Anlo Dialect of Ewe

Collins (1993: Chapter 2) shows the following word order variation in Ewe progressive.

- (111) a. *me fo Kofi*  
           I hit Kofi (Kpele dialect: Collins 1993: (71))
- b. *me le Kofi fo*  
           I am Kofi hitting (Kpele dialect: Collins 1993: (72))
- c. *me le Kofi fo gbe*  
           I am Kofi hitting prt (Kpele dialect: Collins 1993: (74))
- d. *me le Kofi fo m*  
           I am Kofi hitting prt (Anlo dialect: Collins 1993: (75))

Collins (1993: Chapter 2 (76)) proposes that in (111b) the object *Kofi* moves over the verb *fo* ‘hitting’ to the Spec of AGRoP, where the Case feature of the object is checked. In the phrase structure I am adopting here, the Case feature of the object is checked by *v*. Therefore, I assume that the word order where the object precedes the verb is the result of the movement of the object to the Spec of *v*P.

Now, let us consider phonology. The relevant phonological rule is *M Raising*, which raises M to R (extra-high) if M is sandwiched by H’s (see section 2.1). Clements (1978: 46) considers the following frame sentence:<sup>26</sup>

- (112)  $m\bar{e}$  \_\_\_  $f\bar{e}$ -gé  
 I        buying-Prt  
 ‘I’m going to buy \_\_\_’        (Clements 1978: 46)

The tones shown in (112) are the underlying ones. If an object that ends in a H is inserted in ‘\_\_\_’, the M tone on the verb is raised:<sup>27</sup>

- (113)  $m\bar{e}$   $kp\acute{e}$   $f\bar{e}$ -gé    →     $m\grave{e}$   $kp\acute{e}$   $f\acute{e}$  -gé    (Clements 1978: 47)  
 I    stone buying-Prt  
 ‘I’m going to buy a stone’

---

<sup>26</sup> Here, *le* ‘am,’ which is observed in (111) is dropped (Chris Collins (personal communication)).

<sup>27</sup> The interpretation of these sentences is given by the present author. Thanks to Chris Collins for his help.



- (114) a. ākōdú (Clements 1978: 48)  
           ‘banana’
- b. m’ ākōdú flé-gé (Clements 1978: 48)  
           ‘I’m going to buy a banana’

In (113) and (114b), the M tone on the verb is raised because of the preceding H tone on the object. That is, the object that precedes the verb is phonologically phrased with the verb, unlike the object that follows the verb. The movement of the object to the Spec of  $vP$  creates the environment in which M Raising applies.

Now, let us compare the proposed theory with the Edge-based theory and the Relation-based theory.

Selkirk (1986: 391) argues that the phonological phrasing in Ewe can be accounted for under the assumption that the left edge of XP corresponds to the left edge of a phonological phrase. Here XP is a maximal projection of a lexical (but not functional) category (see also Selkirk 1995, Truckenbrodt 1999). Selkirk (1986: 391) assumes the following VP structures for VO and OV orders in Ewe:

- (115) a. [ $_{VP}$  V NP<sub>Obj</sub>]  
       b. [ $_{VP}$  NP<sub>Obj</sub> V]

As Selkirk shows, the alignment of the left edges of XP gives the correct phonological phrasing for the syntactic structures in (115):

- (116) a. (V)<sub>φ</sub> (O)<sub>φ</sub>  
 b. (O V)<sub>φ</sub>

As we have seen before, Collins (1993) argues that the OV order in Ewe is derived from the VO order by moving the object over the verb. Note that it is unlikely that the object moves over the verb within the same VP (see Collins 2003a for a condition that prohibits such movement). Moreover, the head V does not trigger such movement since it is a lexical category; Movement is triggered by uninterpretable features of a functional category (Chomsky 1995b). Thus the structure (115b) where the pre-verbal object stays within VP is not an adequate syntactic analysis. The object has to move out of the VP to a Spec of a functional category, unlike (115b). As I discussed above, I assume that the relevant functional category is *v*:

- (117) NP<sub>Obj</sub> *v* [<sub>VP</sub> V <NP<sub>Obj</sub>>]

It is generally assumed that the verb moves out of VP, adjoining to *v* in transitive constructions (perhaps universally, see Chomsky 1995). Thus, we have the phrase structure (118) for OV order in Ewe:

- (118) [<sub>VP</sub> NP<sub>Obj</sub> V-*v* [<sub>VP</sub> <V> <NP<sub>Obj</sub>>]]

Under the alignment of the left edge of XP, the correct phrasing shown in (116b) is obtained since the left edges of the VP and the moved object NP correspond to the left edges of phonological phrases.

Under the same syntactic assumptions, let us consider the VO order:

$$(119) \left[ {}_{\nu P} \ V-\nu \left[ {}_{VP} \ \langle V \rangle \ NP_{Obj} \right] \right]$$

The alignment of the left edges gives the phrasing in (116a), where the verb and the object are phrased separately, since the left edges of VP and the object NP correspond to those of the phonological phrases.

However, under this approach, it is predicted that the subject is phonologically phrased with the verb in  $\nu$  in SVO order:

$$(120) \left[ {}_{IP} \ NP_{Subj} \ Infl \ \left[ {}_{\nu P} \ V-\nu \left[ {}_{VP} \ \langle V \rangle \ NP_{Obj} \right] \right] \right]$$

$$(121) (S)_{\phi} (V)_{\phi} (O)_{\phi}$$

Here, the left edges of the subject NP, VP, and object NP correspond to those of the phonological phrases. Note that the left edge of  $\nu P$  does not correspond to the left edge of a phonological phrase since  $\nu$  is a functional category. However, as we have seen in (5), the subject is not phrased with the verb in Ewe. That is, the phrasing in Ewe cannot be accounted for under the Edge-based approach, given the proper syntactic analyses.

Now, let us consider the same data within the Relation-based theory of Nespor and Vogel (1986). The phonological phrasings are repeated here:

$$(122) \text{ a. } (S)_{\phi} (V)_{\phi} (O)_{\phi}$$

$$\text{ b. } (S)_{\phi} (O)_{\phi} (V)_{\phi}$$

V and O are phrased separately in the SVO order, as in (122a), and they are phrased together in SOV order, as in (122b). Nespors and Vogel (1986: 168) propose that a lexical head X is phrased with all the clitic groups on its nonrecursive side until another lexical head is reached outside of the maximal projection of X (see (5) in Chapter 1). They (p.180) propose that the restructuring of phonological phrase is not allowed in Ewe.

Given the following syntactic structure which I am adopting, the phrasing in (122a) can be accounted for:

(123)  $[_{IP} [_{NP} \text{Subj}] \text{Infl} [_{vP} V-v [_{VP} <V> [_{NP} \text{Obj} ]]]]$

Here, the object is not phrased with the verb even though the verb is on the nonrecursive side of the verb since the verb is a lexical head that is outside of the NP. Similarly, the verb is not phrased with the subject. However, it is not clear how the phrasing in (122b) is accounted for given the present syntactic assumptions:

(124)  $[_{IP} NP_S \text{Infl} [_{vP} [_{NP} \text{Obj}] V-v [_{VP} <V> <Obj>]]]$

Under Nespors and Vogel's formulation of the phonological phrase formation, the verb is phrased with another lexical head which is inside the maximal projection of the verb. In (124), the verb is adjoined to *v*, and does not head its own projection in that place. Since the object is in the Spec of a functional projection *vP*, the literal interpretation of their

formulation gives the phonological phrasing where the verb and the object are phrased separately since the object on the nonrecursive side of the verb contains the lexical head N which is outside of the maximal projection of the verb, i.e., VP.

Note that the object in the Spec of *v*P may not restructure into the phonological phrase containing the verb in (124) within the Relation-based theory because the restructuring of X to Y is allowed only when X is a complement of Y, and the moved object is not a complement of the verb any more.

Since neither Nespor and Vogel (1986) nor Selkirk (1986) discuss the verb movement and the status of the maximal projection of a functional category to which the verb is adjoined, the conclusion reached so far should be considered to be tentative. However, it seems that the reference to maximal projections causes the problems when the verb movement to a functional head is involved. In (120)/(121), the reference to the subject NP results in a (wrong) phrasing where the subject and the verb are phrased together, and in (123) the reference to the maximal projection of the verb makes it unclear what counts as a maximal projection of the verb after it moves out of the VP. In any case, there should be some additional assumptions in the syntax-phonology mapping algorithm that refers to maximal projections. In the current syntactic theory where functional categories play a central role in deriving syntactic derivation, it seems that the reference to maximal projections of lexical heads would cause some problems such as the one discussed here. In the proposed theory, no such problem arises since there is no reference to the maximal projection, or in fact, there exist no projections at all (see Chapter 1; Collins 2001).

In the proposed theory, the correlation between the word order and phonological phrasing in (122) is accounted for in a straightforward manner. (122a) is obtained by spelling-out the sister of  $v$  and  $C$  given the syntactic structure in (123). By the Spell-Out of the sister of  $v$ , the object is mapped to the phonological component alone, and by the Spell-Out of the sister of  $C$ , the verb in  $v$  is mapped alone and the subject escapes the mapping because it is the initial element in the domain of this Spell-Out. (123b) is obtained by assuming the movement of the object to the Spec of  $vP$  as in (124). Spell-Out of the sister of  $v$  does not map anything to the phonological component since all the elements have moved out of  $VP$ . By the Spell-Out of the sister of  $C$ , the subject escapes the mapping, and the verb in  $v$  and the object in the Spec of  $vP$  are mapped to the phonological component together, resulting in the phonological phrase containing the verb and the object.

### 3.7 Kinyambo: Restructuring to the Right

In this section, I give an account for the phrasing in Kinyambo, repeated here:

- (50) a. (S)<sub>φ</sub> (V O)<sub>φ</sub> [S = branching]  
       b. (S V O)<sub>φ</sub> [S = non-branching]

In Kinyambo, if the subject is non-branching, it is phrased with the following verb. The object is always phrased with the verb irrespective of whether it is branching or not. I assume that the object always moves to



In Italian, the value “left” is chosen. I assume that “right” is chosen in Kinyambo.

(127) Restructuring is always to the right in Kinyambo.

Given (127), consider the stage of derivation where the following p-phrases are created:

(128)  $(S)_\phi (V)_\phi$

Suppose that the subject is non-branching, violating the prosodic branching condition (53):

(129)  $(\omega_S)_\phi (\omega_V)_\phi$

Under (127), the p-phrase containing the subject restructures to the right:

(130)  $(\omega_S)_\phi (\omega_V)_\phi \rightarrow (\omega_S \ \omega_V)_\phi$

This is the phrasing for (125a).

Suppose that the subject is branching:

(131)  $(\omega \ \omega)_\phi (\omega_V)_\phi$

Here the p-phrase containing the subject satisfies the prosodic branching condition (53). Note that the p-phrase containing the verb violates it.



However, under (127), it may not restructure to the left. Therefore, (131) is the phrasing for (125b).

Under this approach, it is predicted that in Kinyambo the right-most p-phrase may be non-branching even if it is not a verb since the right-most non-branching p-phrase cannot restructure to the left. But in S-V-O constructions, this tendency does not manifest itself since O moves to the Spec of *v*P and it is phrased with the verb for structural reasons. To verify this prediction, let us consider the following examples:

- (132) a. (Nejáworech' ábakoz' émbwa)<sub>φ</sub>  
 He-will-show workers dog  
 'He will show the workers the dog.'  
 cf. abakózi 'workers (isolation)' Bickmore (1990: 15)
- b. (Nejákworech' ómukama w'abakózi)<sub>φ</sub> (émbwa)<sub>φ</sub>  
 He-will-show chief of workers dog  
 'He will show the chief of the workers the dog.'  
 Bickmore (1990: 15)

These are double object constructions. The indirect object is non-branching in (132a), while it is branching in (132b). The relevant phonological rule is H Deletion. In (132a), the H in *abakózi* 'workers' is deleted due to the presence of the following word within a p-phrase. In (132b), the same H is not deleted even though the same word follows it, indicating that there is a phonological phrase boundary between *abakózi* 'workers' and *émbwa* 'dog.'

Putting aside the technical details of the analysis of the double object constructions,<sup>28</sup> (132b) shows that the non-branching p-phrase containing the direct object may not restructure to the left in Kinyambo. That is, the right-most p-phrase may be non-branching, as predicted.

In this section, I gave an account for the phonological phrasing in Kinyambo, where the non-branching subject restructures to the right.

#### **4. Summary**

In this chapter, I gave an account for the various phonological phrasing patterns. I adopted the prosodic branching condition proposed by Inkelas and Zec (1995). I showed that the prosodic branching condition gives an account for the wide range of data if it is combined with the proposed parameter concerning the directionality of the restructuring. I argued that this account holds only in the derivational theory of Multiple Spell-Out. I also showed that the structural difference in the object position is related to phonological phrasing.

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<sup>28</sup> See Seidl (2001) for discussions on double object constructions and phonological phrasing in Bantu languages.

**CHAPTER THREE**  
**PHONOLOGICAL PHRASING WITHIN DP IN JAPANESE**

**1. Introduction**

In this chapter, I discuss phonological phrasing within DP in Japanese (Kubozono 1993).<sup>1</sup> I argue that the phonological phrasing is a reflex of syntactic derivation by showing that the restructuring of the phonological phrasing discussed in Chapter 2 takes place derivationally, reflecting the cyclic application of the Multiple Spell-Out. Moreover, I show that the mismatch between the syntactic and phonological constituencies is a result of the derivational application of restructuring.

In Chapter 2, I showed that the restructuring of phonological phrasing applies in some languages, in order to satisfy the condition that a phonological phrase should consist of two or more phonological words (Inkelas and Zec 1995). Thus, the phrasing shown in (1a) is restructured as in (1b) ( $\omega$  = a phonological word).

- (1) a.  $(\omega)_\phi (\omega)_\phi$   
b.  $(\omega \quad \omega)_\phi$

In a derivational approach in general, it is predicted that restructuring reflects the syntactic derivation. To see this point, let us consider a hypothetical sentence that consists of three (phonological) words:

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<sup>1</sup> For phonological phrasing in Japanese, see also Kubozono (1989, 1992), McCawley (1968), Nagahara (1994), Pierrehumbert and Beckman (1988), Poser (1984), Selkirk and Tateishi (1991), among others.

(2) X Y Z

Suppose that X, Y and Z are mapped to the phonological component  $\Phi$  independently of one another. If Z is mapped first, and Y second, we will have the following stage of derivation after Y is mapped to  $\Phi$ .

(3) ( Y )<sub>ϕ</sub> ( Z )<sub>ϕ</sub>

Suppose that restructuring applies to the left in this (hypothetical) language. Then, at this stage of the derivation, the phonological phrase containing Z restructures to the left, as in (4):

(4) ( Y )<sub>ϕ</sub> ( Z )<sub>ϕ</sub> → ( Y Z )<sub>ϕ</sub>

Note, in passing, that restructuring applies for purely phonological reasons, i.e., in order to make a phonological phrase contain two or more phonological words. The representation in (3) or (4) is an output of the mapping to  $\Phi$ , so no syntactic information is available when the restructuring takes place.

At the next stage of the derivation, X is mapped to  $\Phi$ :

(5) ( X )<sub>ϕ</sub> ( Y Z )<sub>ϕ</sub>

At this point, the phonological phrase containing Y and Z does not restructure into the one containing X, since it already contains two phonological words. Also, the phonological phrase containing X may not

restructure to the one containing Y and Z under the assumption that the restructuring is to the left. Therefore, (5) is the final representation for this derivation.

Now suppose that B is mapped to  $\Phi$  first, A second, and C third, in the derivation of (6) which consists of three phonological words:

(6) A B C

Restructuring applies when A is mapped to  $\Phi$ :

(7) ( A )<sub>φ</sub>( B )<sub>φ</sub> → ( A B )<sub>φ</sub>

Here, the p-phrase containing B restructures to the left. When C is mapped to  $\Phi$ , the following phrasing is obtained:

(8) ( A B )<sub>φ</sub>( C )<sub>φ</sub>

At this point, the phonological phrase containing C restructures to the one containing A and B since it contains only one phonological word:

(9) ( A B )<sub>φ</sub>( C )<sub>φ</sub> → ( A B C )<sub>φ</sub>

Notice that the different phonological phrasings in (9) and (5), repeated below in (10a) and (10b), respectively, result from the application of the restructuring for purely phonological reasons at each stage of the derivation.

- (10) a. ( A B C )<sub>φ</sub>  
 b. ( X )<sub>φ</sub> ( Y Z )<sub>φ</sub>

The application of restructuring does not, and in fact cannot, see the syntactic information at all since it applies to the output of the mapping to  $\Phi$ . Therefore, the difference between (10a) and (10b) reflects the syntactic derivation.

In contrast, in a representational approach the difference between (10a) and (10b) cannot be distinguished for purely phonological reasons since the mapping algorithm needs to refer to the syntactic difference between them, such as branchingness of the syntactic tree.<sup>2</sup> Otherwise we would have some ambiguity in the application of the restructuring. Suppose that the following phrasing is obtained in a representational approach:

- (11) ( X )<sub>φ</sub> ( Y )<sub>φ</sub> ( Z )<sub>φ</sub>

If restructuring were to apply to (11) for purely phonological reasons, it is equally possible to restructure Y into X, or Z into Y. That is, the phrasings in (10a) and (10b) cannot be distinguished in the representational approach for purely phonological reasons.

In this chapter, I illustrate such a derivational approach by using the data on Japanese DP (Kubozono 1993) within the proposed theory of syntax-phonology mapping.

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<sup>2</sup> For such algorithms, see Cowper and Rice 1987 within the Edge-based approach, and Nespor and Vogel 1986 in the Relation-based approach. They refer to branchingness of syntactic trees.

## 2. DP in Japanese

### 2.1 Previous Analysis

Let us consider the following set of data observed by Kubozono (1993: 146):

(12) a. [[naomi-no ane-no] [marui yunomi]]

Naomi-Gen sister-Gen round teacup

‘Naomi’s sister’s round cup’

b. [[ naomi-no [ue-no ane-no]] yunomi ]

Naomi-Gen upper-Gen sister-Gen teacup

‘Naomi’s eldest sister’s teacup’

c. [ naomi-no [[ ume-no iro-no] yunomi]]

Naomi-Gen plum-Gen color-Gen teacup

‘Naomi’s plum-colored teacup’

d. [ naomi-no [omoi [ marui yunomi]]]

Naomi-Gen heavy round teacup

‘Naomi’s heavy round teacup’

(13) a.  $\overline{\text{na}}\overline{\text{omino}} \overline{\text{ane}}\overline{\text{no}} \overline{\text{ma}}\overline{\text{rui}} \overline{\text{yunomi}}$  = (12a)

( )<sub>φ</sub> ( )<sub>φ</sub>

b.  $\overline{\text{na}}\overline{\text{omino}} \overline{\text{ue}}\overline{\text{no}} \overline{\text{ane}}\overline{\text{no}} \overline{\text{yunomi}}$  = (12b)

( )<sub>φ</sub> ( )<sub>φ</sub>

c.  $\overline{\text{na}}\overline{\text{omino}} \overline{\text{u}}\overline{\text{me}}\overline{\text{no}} \overline{\text{i}}\overline{\text{ro}}\overline{\text{no}} \overline{\text{yunomi}}$  = (12c)

( )<sub>φ</sub> ( )<sub>φ</sub>

d.  $\overline{\text{na}}\overline{\text{omino}} \overline{\text{o}}\overline{\text{moi}} \overline{\text{ma}}\overline{\text{rui}} \overline{\text{yunomi}}$  = (12d)

( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>

Kubozono (1993: 146)

Each of the patterns is a DP consisting of the four phrases. All the phrases are unaccented here. (12) shows the syntactic constituency (indicated by the square brackets), and (13) shows the phonological phrasing (indicated by the round brackets). The lines on the data in (13) schematically show the pitch level or fundamental frequency. The rise of the fundamental frequency, or *Initial Lowering*, indicates the beginning of the phonological phrase.

Note that in (12b)/(13b), repeated below, the syntactic constituency does not coincide with the phonological one:

(14) a. [[ naomi-no [ue-no ane-no]] yunomi ]

Naomi-Gen upper-Gen sister-Gen teacup

‘Naomi’s eldest sister’s teacup’ (Kubozono 1993:146)

b.  $\overline{\text{na}}\text{omino} \quad \overline{\text{u}}\text{eno} \quad \text{aneno} \quad \text{yunomi}$   
 i. [ [ [ ] [ ] ] ] --- syntax  
 ii. ( )<sub>φ</sub> ( )<sub>φ</sub> --- phonology

In this DP, *ue* ‘upper’ modifies *ane* ‘sister,’ *naomi* ‘Naomi’ modifies the syntactic constituent made up of *ue* ‘upper’ and *ane* ‘sister,’ and the syntactic constituent made up of these three elements modifies the head noun *yunomi* ‘teacup.’ If we divide the DP into two in terms of syntactic constituency, the first three elements correspond to one syntactic constituent, and the head noun *yunomi* ‘teacup’ corresponds to the other, as shown in (14b.i). In contrast, the prosodic behavior shows that there is a phonological phrase boundary between *naomi-no* and *ue-no* since Initial



Lowering occurs at the beginning of *ue* ‘upper’ (and *naomi*). That is, the first element *naomi-no* ‘Naomi-Gen’ corresponds to one phonological constituent, and the last three elements correspond to the other phonological constituent, as shown in (14b.ii).

Note that such a mismatch in constituency is important because it motivates the existence of the syntax-phonology mapping. If there is no such mismatch, it would be unnecessary to postulate the mapping mechanism.

Kubozono (1993: 154), following Fujisaki and Sudo (1971), proposes the following constraint to account for the data:

(15) *Branching Constraint Hypothesis*:

Minor Phrase Formation is blocked between two elements where the right-hand member branches.

Here, “Minor Phrase” is equivalent to what I call a phonological phrase or p-phrase. Under this constraint, the phonological phrasings in (12)/(13) are accounted for in the following way. For example, in (12b/13b), the right-hand member [*ue-no ane-no*] ‘upper sister’ branches in [[*naomi-no [ue-no ane-no]*] ‘naomi’s upper sister,’ and Minor Phrase Formation is blocked between *naomi-no* and *ue-no*, therefore they are phonologically phrased separately.

Notice that under (15) Minor Phrase Formation has to refer to the branchingness of the syntactic tree. In the theory of syntax-phonology mapping in general, it is desirable to restrict the syntactic information available to phonology (see Chapter 1). That is, a theory that does not

refer to the branchingness of the syntactic tree is more desirable. The proposed approach does not, and in fact cannot, refer to the branchingness of the syntactic tree: It can only refer to the output of the mapping to the phonological component  $\Phi$ , which is non-syntactic in nature. In what follows, I show that the proposed mapping algorithm accounts for the data, without a reference to syntactic information.

## 2.2 Proposed Analysis

First, I will introduce some basic assumptions necessary for the analysis. I assume that the data in (12) have DP-structure (Abney 1987), and that D is a phase head (cf. Chomsky 2001b: 5):

(16) D is a phase head: its sister is spelled-out.

As I proposed in Chapter 1, I assume that linear order is defined by Spell-Out:

(17) Linear order is defined by Spell-Out.

I adopt the following assumptions about the genitive Case particle in Japanese:

- (18) a. The genitive Case is checked by D.  
 b. Case particles are bound to the preceding element.

Under (18), the genitive Case particle *-no* is attached to the right side of the specifier element of DP as a reflex of Case checking. As a result of (18b), we obtain a morphological unit consisting of a DP and a Case particle. I assume that such a morphological unit may not be disrupted by a p-phrase boundary unless some other overriding factor comes in.<sup>3, 4</sup>

(19) No p-phrase boundary may intervene between X and Case particle in [X]-[Case Particle].

In the phonological component  $\Phi$ , restructuring of the p-phrases takes place if there is a violation of the prosodic branching constraint (20), as we have discussed in Chapter 2. I assume that restructuring is to the left in Japanese:

(20) [  $\omega$   $\omega$  ] <sub>$\phi$</sub>

(“a preferred phonological phrase is one which consists of at least two phonological words” (Inkelas and Zec 1995:544))

(21) Restructuring is to the left in Japanese.

Thus, the restructuring shown in (22a) below applies to satisfy (20), while

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<sup>3</sup> If a contrastive stress is assigned to the Case particle, a phonological boundary is created between the element to which the Case particle is bound and the Case particle. See Nagahara 1994.

<sup>4</sup> As John Whitman (personal communication) pointed out to me, in (19) “Case particle” could be replaced by “clitic” in general since the other

the restructuring shown in (22b) does not apply even if there is a violation of (20) since it is to the right:

- (22) a.  $(\omega \omega)_\phi (\omega)_\phi \rightarrow (\omega \omega \omega)_\phi$   
 b.  $*(\omega)_\phi (\omega \omega)_\phi \rightarrow (\omega \omega \omega)_\phi$

A question arises as to whether a Case particle in Japanese is considered to be a phonological word  $\omega$  so that it qualifies as a  $\omega$  in (20). If it is, then a p-phrase containing a noun and a Case particle satisfies the prosodic branching constraint (20). I assume that the Case particle is a phonological word for the following reasons. Consider (23):

- (23) John-ga            hon-o        yomu  
 John-Nom        book-Acc read(pres.)  
 (                    )<sub>ϕ</sub> (                    )<sub>ϕ</sub>  
 ‘John reads a book.’                    (adapted from Nagahara 1994)

Here, *John*, *hon*, and *yomu* are accented words. So the phonological phenomenon relevant to phonological phrasing here is downstep, a downward shift of the pitch range within a phonological phrase (see Kubozono 1993, Nagahara 1994, Pierrehumbert and Beckman 1988, Poser 1984, among others). In (23) there is a downstep between *hon-o* ‘book-Acc’ and *yomu* ‘read,’ but not between *John-ga* ‘John-Nom’ and *hon-o* ‘book-Acc.’ Assuming that the downstep occurs within a p-phrase,

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particles such as *mo* ‘also’ seem to show a similar phonological property. I continue to assume (19) since I do not discuss the other particles here.

*John* plus the nominative Case particle *-ga* correspond to a single p-phrase, and *hon* plus the accusative Case particle *-o* and the verb *yomu* correspond to another p-phrase in (23). Since *John* plus *-ga* corresponds to a single p-phrase, it could be the case that the Case particle is a phonological word, and the p-phrase containing *John* and *-ga* satisfies the prosodic branching condition. However, it would also be the case that the second p-phrase cannot restructure into the first one since the second p-phrase containing the object *hon*, the Case particle *-o*, and the verb *yomu* has already satisfied the prosodic branching condition even if the Case particle *-o* is not a phonological word. To see if a Case particle is a phonological word, consider (24):

- (24) John-ga      hon-o      yomu      rashii  
       John-Nom    book-Acc    read(Pres)    seem  
       (            )<sub>φ</sub> (            )<sub>φ</sub> (            )<sub>φ</sub>

‘It seems that John reads a book.’

(Poser 1984:, Nagahara 1994, cf. Kubozono 1993)

Here, *rashii* ‘seem’ immediately follows *yomu* ‘read,’ and they form a single p-phrase.<sup>5</sup> It is important to notice that the phonological phrasing

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<sup>5</sup> Kubozono (1993:127-130) observes that there are cases where the accent of the second verb (AUX) shows up. That is, we may have the following optionality in phonological phrasing:

- (i) John-ga      hon-o      yomu      rashii  
       -Nom    book-Acc    read(Pres)    seem  
       (            ) (            ) (            ), or  
       (            ) (            ) (            )

The data used in his experiments are shown below:

in (24) shows that in principle the object *hon* ‘book’ plus Case particle *-o* may correspond to a single p-phrase on their own, excluding the verb, in contrast with (23). (24) also shows that the p-phrase containing the object *hon* and Case particle *-o* satisfies the prosodic branching condition, and that it does not need to undergo restructuring to the preceding p-phrase containing the subject *John* and a Case particle *-ga*, indicating that the Case particle is a phonological word. Therefore, I assume the following:<sup>6</sup>

(25) Case particles are phonological words in Japanese.

So far, I have presented some assumptions relevant to the discussion of the Japanese data. I assume that the examples to be discussed have DP-structure, where D is a strong phase head (16). Genitive Case is checked by D, and the Case particle is bound by the specifier element in the DP (18). No p-phrase boundary may intervene between the specifier element and the bound Case particle (19). The Case particle is a phonological

- 
- |         |                 |               |   |                        |
|---------|-----------------|---------------|---|------------------------|
| (ii) a. | mi’ru-daro’o    | ‘see will’    | = | will see               |
|         | ka’eru-yo’oda   | ‘return-look’ | = | (he) appears to return |
|         | b. no’nde mi’ru | ‘drink see’   | = | try drinking           |
|         | ka’ite iru      | ‘write-be’    | = | is writing’            |

I will not discuss the phonological phrasing of the “branching verbs,” but the optionality does not argue for or against the claim that in principle the (non-branching) object plus a Case particle correspond to one phonological phrase of its own. Rather, it argues for the claim that the prosodic branching condition is about preference (Inkelas and Zec 1995).

<sup>6</sup> See Nagahara 1994: 29. See also Vance 1993 and Whitman 2001 for the discussion on the prosodic status of Case Particles. See also Zec and Inkelas 1991 for the status of clitics in prosodic hierarchy.

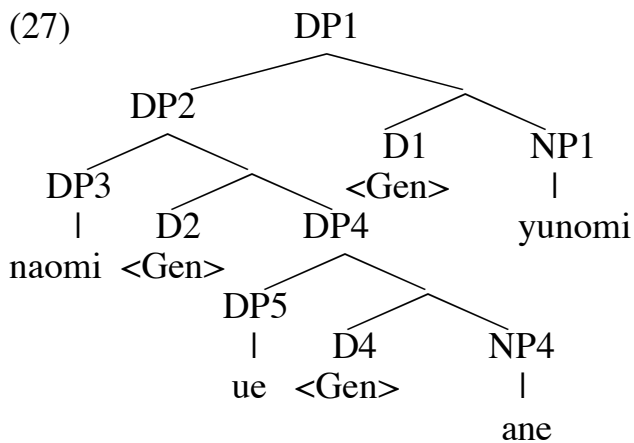
word (25), qualifying as a “ $\omega$ ” in the prosodic branching condition (20).

And restructuring applies to the left to satisfy (20).

Now, let us first consider (12b/13b), repeated here, where the syntactic constituency does not coincide with the prosodic one.

- (26) [[ naomi-no [ue-no ane-no]] yunomi ]  
 Naomi-Gen upper-Gen sister-Gen teacup  
 ( ) <sub>$\phi$</sub>  ( ) <sub>$\phi$</sub>   
 ‘Naomi’s eldest sister’s teacup’

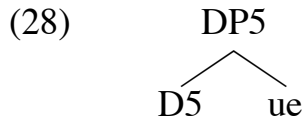
I assume the following syntactic structure for (26) (Whitman 2001):



I adopt a DP-recursion structure for the two or more occurrences of the genitive Case particle *-no* (cf. Whitman 2001). I assume that in a DP-

recursion structure, each D is a phase head.<sup>7</sup> Thus, the sister of each D is spelled-out. <Gen> under each D stands for genitive Case.<sup>8</sup>

Let us first consider the Spell-Out of the sister of the head of DP5.<sup>9</sup> I assume that DP5 has the following internal structure:



Since *ue* is the sister of D, it is spelled-out. However, since it is the initial element in the domain of this spell-out, it is not mapped to  $\Phi$  at this point. Similarly, *ane*, which is a sister of D4, is spelled-out, but it is not mapped to  $\Phi$ .

Let us next consider the Spell-Out of the sister of D2:

(29) Spell-Out (Sister of D2)

- a. C-Command domain of D4:  $\langle \text{D4}, \text{ane} \rangle_{\text{C-COM}}$ ,
- b. Rest:  $\langle \text{DP5}, \text{D4} \rangle_{\text{OCC}}$ ,
- c. As a whole:  $\text{DP5} \ll \text{D4} \ll \text{ane}$
- d. Mapping to  $\Phi$ :  $(\text{ane})_{\phi}$

<sup>7</sup> *Naomi* and *ue* may be base-generated within the sister of D4 and raise into the Spec of D. Since the underlying structure is irrelevant to the phonological phrasing, I will not discuss it here.

<sup>8</sup> Within the framework of Chomsky (2000, 20001a, b), D does not have a Case feature; rather, it is a probe which has a set of uninterpretable phi-features, and the Case feature of a goal DP is deleted under Agree. I put aside these technical details here.

<sup>9</sup> Note that the Spell-Out may apply to the sisters of D5, D4, D3 at the same time.



Here, Spell-Out defines the linear order, as in (29c).<sup>10</sup> It maps the linear string to  $\Phi$ , except for the initial element DP5 containing *ue* ‘upper’, as in (29d). Note that technically the sister of D5, i.e., *ue*, is also mapped to  $\Phi$  at this point since it has been spelled-out before within DP5.

However, since D5, which is part of the initial element for this Spell-Out, is not mapped to  $\Phi$  at this point, the linear order of *ue* with respect to *ane* cannot be determined in  $\Phi$  until D5 is mapped to  $\Phi$ . (D5 c-commands *ue* within DP5, and checks the OCC feature of D4 which c-commands *ane*.) Therefore, even if *ue* is in  $\Phi$ , it cannot undergo p-phrase level phonological rules since the linear order with respect to the other elements has not been determined.

In (29), the genitive Case particle *-no*, which is a phonetic realization of the Case checking between D4 and DP5 containing *ue*, is not phonetically realized since the Case particle has to be bound to *ue*, which has not been mapped to  $\Phi$  in (29). The Case particle will be realized on *ue* when D5 is mapped to  $\Phi$ . In general, a Case particle is introduced when its host is mapped to  $\Phi$  under (18b).

The next step is to spell-out the sister of D1.<sup>11</sup> Since *yunomi* ‘teacup’ is the initial element in the domain of this Spell-Out, it is not mapped to  $\Phi$

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<sup>10</sup> Here, D5 checks the OCC feature of D4, and the constituent corresponding to DP5 is pied-piped and merged and becomes a Spec of DP4, and the Linear Order is defined so that it does not violate the ban on interpolation proposed at the end of Chapter 1. Since such technical details are irrelevant to the present discussion, I will not go into them in this chapter.

<sup>11</sup> Note that this Spell-Out may occur before, or in parallel with, the Spell-Out of the sister of D4, D5, D2.

at this point. Similarly, the sister of the head of DP3, *naomi*, is spelled-out, but it is not mapped to  $\Phi$ .

The next step is to spell-out the entire DP, perhaps as part of the larger structure. By this Spell-Out, the following items are spelled-out:

(30) S-O (larger structure): D2, D1

So far, *ane* has been mapped to  $\Phi$ , and the following items have been spelled-out, but the linear order of them has not been established so far:

(31) *naomi, ue, yunomi*

Now, the linear order internal to DP2 and the linear order within the entire DP1 have to be defined at this point. As I discussed at the end of Chapter 1, the linear order within DP2 has to be defined before the linear order within the entire DP1 because the former is preserved when the latter is defined (cf. Uriagereka 1999).

The linear order within DP2 is defined as follows:

(32) Within DP2

- |                            |                                       |
|----------------------------|---------------------------------------|
| a. C-Command domain of D2: | $\langle D2, DP5 \rangle_{C-COM}$ ,   |
| b. Rest:                   | $\langle DP3, D2 \rangle_{OCC}$ ,     |
| c. As a whole:             | <i>naomi</i> $\ll$ D2 $\ll$ <i>ue</i> |
| d. Mapping to $\Phi$ :     | $(ue)_\phi$                           |

Note that DP5 containing *ue* ‘upper’ is available to (32a) since it has not been mapped to  $\Phi$  in (29). The linear order is defined as in (32c). Then, the mapping applies to the linear order defined in (32c). Here, DP3 containing *naomi* escapes the mapping since it is the initial element here. Note that the Case particle *-no*, which is the phonetic realization of the Case-checking between D2 and *naomi*, has to go with the mapping of *naomi* under (18b). Therefore, only *ue* is mapped to  $\Phi$ , as in (32d). At this point, *ue* is linearly ordered with respect to *ane* in terms of (29c), and the Case particle, which is a reflex of Case checking against D4, is bound to the host *ue* under (18b). This mapping results in the following phonological phrasing:

(33) (ue-no)<sub>φ</sub> (ane)<sub>φ</sub>

At this point of the derivation, the p-phrase (ane)<sub>φ</sub> violates the prosodic branching condition, and it undergoes restructuring to the left:

(34) (ue-no)<sub>φ</sub> (ane)<sub>φ</sub> → (ue-no ane)<sub>φ</sub>

So far, the linear order within DP2 has been defined, and the mapping has taken place, except for the initial element *naomi*. The next step is to map *naomi* and D2, which escaped the mapping before:

(35) (naomi-no)<sub>φ</sub> (ue-no ane)<sub>φ</sub>

Here, *-no*, which is a reflex of Case checking by D2, is bound to *naomi* under (18b). It is included in the p-phrase containing *naomi* under (19). Since the second p-phrase contains three phonological words, it does not undergo restructuring.

At this point, the mapping within DP2 has been completed.

Lastly, the linear order within the entire DP1 is defined and it is mapped to  $\Phi$ .

- (36) a. C-Command domain of D1:  $\langle D1, \text{yunomi} \rangle_{C-COM}$ ,  
 b. Rest:  $\langle DP2, D1 \rangle_{OCC}$ ,  
 c. As a whole:  $DP2 \ll D1 \ll \text{yunomi}$   
 d. Mapping to  $\Phi$ :  $(\text{yunomi})_{\phi}$

In (36a-c), the linear order is defined within DP1. Then, *yunomi* is mapped to  $\Phi$ , as in (36d). And also, the Case particle resulting from the checking between DP2 and D1 is bound to *ane* at this point. Even though the p-phrase  $(\text{ue-no ane})_{\phi}$  has already been formed, the Case particle *-no* is incorporated into that p-phrase under (18b) and (19). Then, the phrasing in (37a) is obtained, and the p-phrase containing *yunomi* undergoes the restructuring as in (37b):

- (37) a.  $(\text{naomi-no})_{\phi} (\text{ue-no ane-no})_{\phi} (\text{yunomi})_{\phi} \rightarrow$   
 b.  $(\text{naomi-no})_{\phi} (\text{ue-no ane-no yunomi})_{\phi}$

(37b) is the final representation obtained for this derivation, as expected.

### 2.3 Comparison with the Other Proposals

In this section, I compare the proposed analysis with the representational theories. I discuss Relation-based theory and Edge-based theory mentioned in Chapter 1.

Nespor and Vogel (1986) propose the following mapping algorithm for Japanese:

(38) *Relation-based Theory (for Japanese):*

X is a head and forms a  $\Phi$  with whatever follows until another head outside of the maximal projection of X is reached.

(Nespor and Vogel 1986: 183)

Within the Edge-based theory, Nagahara (1994) argues that the left edge of a lexical XP coincides with the left edge of a phonological phrase (the following formulation is due to Truckenbodt 1999. See also Selkirk and Tateishi 1991):

(39) *Edge-based Theory:*

Align-XP, L: Align (XP, L; P, L)

“For each XP there is a P such that the left edge of XP coincides with the left edge of P.”

(Nagahara 1994, Selkirk and Tateishi 1991, Truckenbrodt 1999)

If we apply these mapping algorithms to the example (26), reproduced in (40a), each lexical head forms a phonological phrase with the following Case particle as in (40b):

(40)

- a. [<sub>DP</sub> [<sub>DP</sub> [<sub>NP</sub> naomi-no] [<sub>D'</sub> [<sub>NP</sub> ue-no] [<sub>D'</sub> D [<sub>NP</sub> ane]]]]]-no] D [<sub>NP</sub> yunomi]]
- b.            (naomi-no)<sub>φ</sub>        (ue-no)<sub>φ</sub>            (ane-no)<sub>φ</sub>            (yunomi)<sub>φ</sub>  
                  Naomi-Gen        upper-Gen            sister-Gen            teacup

If the restructuring triggered by the prosodic branching condition applies to (40b), we will obtain the following phonological phrasing, which is not a desired result:

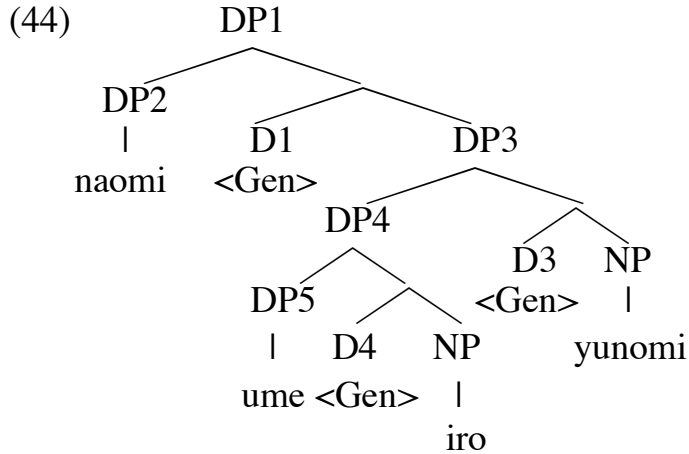
- (41) (naomi-no)<sub>φ</sub> (ue-no)<sub>φ</sub> (ane-no)<sub>φ</sub> (yunomi)<sub>φ</sub>  
       → (naomi-no)<sub>φ</sub> (ue-no)<sub>φ</sub> (ane-no yunomi)<sub>φ</sub>

Suppose that, contrary to what I suggested in (25), Case particles are in fact not phonological words. Then each phonological phrase in (40b) is taken to be non-branching, violating the prosodic branching condition. If the restructuring applies to the representation from left to right or right to left, the following phonological phrasing results:

- (42)            (naomi-no ue-no)<sub>φ</sub> (ane-no yunomi)<sub>φ</sub>

In order to obtain a desired result within these approaches, we might need to stipulate that the right branching members in a syntactic constituent (that is, [[ue-no] [ane-no]] in [[naomi-no] [[ue-no] [ane-no]]]) form a single phonological phrase (cf. (15)). However, this stipulation has to refer to the branchingness of a syntactic tree, which is undesirable.





First, the following Spell-Outs apply within DP5, DP4, DP3 and DP2:

- (45) a. Spell-Out(Sister of the head of DP5)  
*ume* escapes the mapping to  $\Phi$
- b. Spell-Out(Sister of D4)  
*iro* escapes the mapping to  $\Phi$
- c. Spell-Out(Sister of D3)  
*yunomi* escapes the mapping to  $\Phi$
- d. Spell-Out(Sister of Head of DP2)  
*naomi* escapes the mapping to  $\Phi$

Here, each of the spelled-out elements is the initial element in the domain of the Spell-Out. So they are not mapped to  $\Phi$ .

Now, Spell-Out applies to the sister of D1. First, the Linearization and Mapping take place within DP4 since DP4 is the Spec of DP3:



- (46) Linearization and Mapping within DP4
- a. C-Command Domain of D4:  $\langle D4, iro \rangle_{C-COM}$
  - b. Rest:  $\langle DP5: D4 \rangle_{OCC}$
  - c. As a whole:  $ume \ll D4 \ll iro$

Note that DP5 containing *ume* alone cannot be the initial element here because it does not c-command D3 or it does not check the OCC feature of D3, and it cannot serve as the shared member of the current and the next units of Spell-Out. Therefore, the constituent containing D4 which checks the OCC feature of D3, namely, DP4 as a whole, is the initial element, and escapes the mapping to  $\Phi$  (see the end of Chapter 1). The sister of D4, *iro*, which was spelled-out and escaped the mapping at the previous Spell-Out, is mapped to  $\Phi$  at this point.

(47)  $(iro)_\phi$

Similarly, *yunomi*, which was spelled-out and escaped the mapping before, is also mapped to  $\Phi$ :

(48)  $(yunomi)_\phi$

Note that  $(iro)_\phi$  and  $(yunomi)_\phi$  are not linearly ordered with respect to each other in  $\Phi$  at this point since D4, which checks the OCC feature of D3, has not been mapped to  $\Phi$ . *Iro* is ordered with respect to *yunomi* by virtue of D4 and D3: D4 c-commands *iro*, D4 checks the OCC feature of

D3, and D3 c-commands *yunomi*, and hence *iro* precedes *yunomi*.

Therefore, the restructuring does not apply to them at this point.

The next step is to spell-out the entire DP:

(49) Spell-Out (DP1)

a. C-Command domain:  $\langle D1, DP4 \rangle_{C-COM}$

b. Rest:  $\langle DP2, D1 \rangle_{OCC}$

c. As a whole:  $DP2 \ll D1 \ll DP4$

At this point, the linear order between the domain of the Spell-Out of DP1 and the domain of the Spell-Out of the sister of D1 is determined by virtue of DP4, which is the initial element of the Spell-Out of the sister of D1.

At this point, *ume* and D4 are mapped to  $\Phi$ , and ordered with respect to the p-phrase containing *iro*. And the Case particle, which is a reflex of Case checking against D4, is bound to *ume* under (18b):

(50)  $(ume-no)_\phi (iro)_\phi$

Note that DP2 escapes the mapping since it is the initial element in this Spell-Out. In the phonological component, the restructuring applies to (50):

(51)  $(ume-no)_\phi (iro)_\phi \rightarrow (ume-no \ iro)_\phi$

Now, the mapping within DP4 has been completed at this point. The next step is Linearization and Mapping within DP3, which were postponed

when the sister of D1 was spelled-out since the linear order within DP4 had not been defined yet:

(52) Linearization and Mapping within DP3:

- a. C-Command Domain of D3:  $\langle D3, \text{yunomi} \rangle_{\text{C-COM}}$
- b. Rest:  $\langle DP4, D3 \rangle_{\text{OCC}}$
- c. As a whole:  $DP4 \ll D3 \ll \text{yunomi}$
- d. Mapping to  $\Phi$ :  $(\text{yunomi})_{\phi}$

Here, the linear order is defined as in (52c), and only *yunomi* ‘teacup’ is mapped to  $\Phi$ . Note that the Spec of DP3, i.e., DP4 already served as the initial element in (49) and was mapped to  $\Phi$  in (50). Therefore, the following p-phrasing is obtained at this point:

(53)  $(\text{ume-no iro-no})_{\phi} (\text{yunomi})_{\phi}$

Restructuring applies to (53) as follows:

(54)  $(\text{ume-no iro-no})_{\phi} (\text{yunomi})_{\phi} \rightarrow (\text{ume-no iro-no yunomi})_{\phi}$

Finally, the rest of the structure is mapped to  $\Phi$ :

(55) Mapping of the rest within DP1:

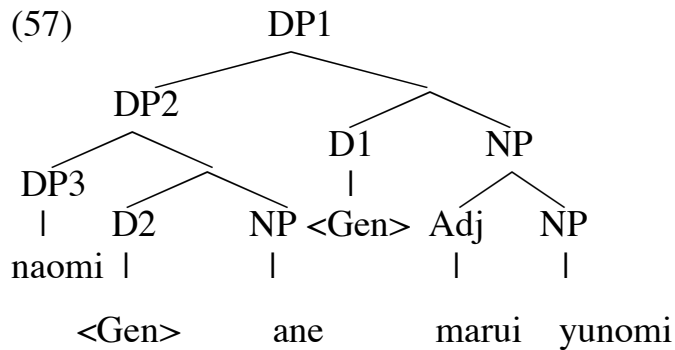
Mapping to  $\Phi$ :  $(\text{naomi-no})_{\phi} (\text{ume-no iro-no yunomi})_{\phi}$

Here, there is no violation of the prosodic branching condition, hence no restructuring. And this is the resulting phonological phrasing.

Now, let us examine the examples with adjuncts. Let us first consider (12/13a), repeated here:

- (56) [[naomi-no ane-no] marui yunomi]]  
 Naomi-Gen sister-Gen round teacup  
 ( )<sub>ϕ</sub> ( )<sub>ϕ</sub>  
 ‘Naomi’s sister’s round cup’

I assume the following syntactic structure for this example:



Let us start with the derivation within DP2. First, the sister of the head of DP3, *naomi*, and the sister of D2, *ane* ‘sister’ are spelled-out. Since these are the initial elements, they are not mapped to  $\Phi$  at this point.

Let us next consider the Spell-Out of the sister of D1. Here the adjective *marui* ‘round’ is adjoined to the NP *yunomi* ‘teacup.’ Following Chomsky (2001: 20), I assume the following formulation of the Spell-Out of adjoined elements:

(58) In  $\langle \alpha, \beta \rangle$ ,  $\alpha$  is spelled out where  $\beta$  is. (Chomsky BEA: 20)

Here,  $\alpha$  is adjoined to  $\beta$ . Under this principle, “ $\alpha$  is integrated into the linearly ordered structure at the stage of derivation where  $\beta$  is spelled-out (Chomsky 2001b: 20).” In order to simplify the exposition here, I will assume that  $\alpha$  is spelled-out when  $\beta$  is spelled-out, and  $\alpha$  defines the linear order between  $\alpha$  and  $\beta$ . Thus, given  $\langle \alpha, \beta \rangle$ , when Spell-Out applies to  $\beta$ ,  $\alpha$  is also spelled-out and linearly ordered with respect to  $\beta$ .

In (57), Spell-Out of the sister of D1 and Spell-Out of the adjunct *marui* take place at the same time. I assume that the Spell-Out of the adjunct  $\alpha$  in  $\langle \alpha, \beta \rangle$  defines the linear order where  $\alpha$  precedes  $\beta$  (at least in Japanese). Then, the Spell-Out of the adjunct *marui* defines the linear order in the following way:

(59) Spell-Out (Sister of D1)

- a. Linear Order:  $\langle \text{marui}, \text{yunomi} \rangle_{\text{Adjunct}} : \text{marui} \ll \text{yunomi}$
- b. Mapping to  $\Phi$ :  $\text{yunomi} : (\text{yunomi})_{\Phi}$

The linear order is defined as in (59a). Since *yunomi* ‘teacup’ has also been spelled-out at this point, it is mapped to  $\Phi$  here, leaving the initial element *marui*.

The next step is to spell-out the entire DP1 (as part of a larger structure), which spells-out D1 and D2. As I discussed below (31) and at the end of Chapter 1, the linear order within the Spec is defined before that of the entire structure. Thus, the linear order within DP2 is defined first:

- (60)
- |                            |                                          |
|----------------------------|------------------------------------------|
| a. C-Command Domain of D2: | $\langle D2, \text{ane} \rangle_{C-COM}$ |
| b. Rest:                   | $\langle DP3, D2 \rangle_{OCC}$          |
| c. As a whole:             | $\text{naomi} \ll D2 \ll \text{ane}$     |
| d. Mapping to $\Phi$ :     | $(\text{ane})_{\phi}$                    |

The linear order is defined as in (60c), and *ane* is mapped to  $\Phi$ , corresponding to a p-phrase, as in (60d). Note that the edge elements of DP2, *naomi* and D2, are the initial elements and escape the mapping here.

The next step is to map *naomi* and D2, which escaped the mapping to  $\Phi$  at the previous stage. Note that in  $\Phi$  the linear order among DP2, D1 and the NP containing *marui yunomi* cannot be determined until D2 is mapped to  $\Phi$  since D2 checks the OCC feature of D1 which c-commands the NP. When *naomi* is sent to  $\Phi$ , the Case particle *-no*, which is a realization of Case-checking by D2, is bound to *naomi* under (18b):

- (61)  $(\text{naomi-no})_{\phi} (\text{ane})_{\phi}$

Here, the p-phrase  $(\text{ane})_{\phi}$  violates the prosodic branching condition, and undergoes restructuring to the left:

- (62)  $(\text{naomi-no})_{\phi} (\text{ane})_{\phi} \rightarrow (\text{naomi-no ane})_{\phi}$

Note that  $(\text{yunomi})_{\phi}$ , which has already been mapped to  $\Phi$  before (see (59)), does not enter into (62), since the linear order between them has not been established yet at this point. It is established by virtue of D1, which has not been mapped to  $\Phi$ .

The next step is the Linearization and Mapping within the entire DP1.

- (63) a. C-Command Domain of D1:  $\langle D1, \text{marui} \rangle_{\text{C-COM}}$   
 b. Rest:  $\langle DP2, D1 \rangle_{\text{OCC}}$   
 c. As a whole:  $DP2 \ll D1 \ll \text{marui}$

Here, the linear order is defined as in (63c), and *marui* is mapped to  $\Phi$  and the Case particle is bound to *ane* under (18b):

- (64)  $(\text{naomi-no ane-no})_{\phi} (\text{marui})_{\phi} (\text{yunomi})_{\phi}$

Here,  $(\text{yunomi})_{\phi}$  violates the prosodic branching condition, and undergoes restructuring to the left:

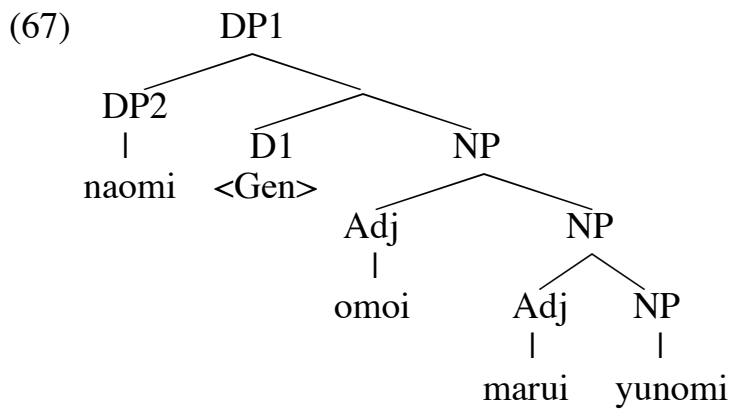
- (65)  $(\text{naomi-no ane-no})_{\phi} (\text{marui yunomi})_{\phi}$

I will return shortly to the reason why  $(\text{marui})_{\phi}$  may not restructure into the preceding p-phrase. (65) is the final representation of the derivation. The important step in this derivation is where the p-phrase containing just *ane* restructures into the preceding p-phrase containing *naomi-no* before *-no* is attached to *ane*.

Let us next consider (12/13d), repeated here. It involves multiple adjunction to a NP:

- (66) [ naomi-no [ omoi [ marui yunomi]]]  
 Naomi-Gen heavy round teacup  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ‘Naomi’s heavy round teacup’

I assume the following syntactic structure for (66):



First, the sister of D1 is spelled-out, and the two adjectives adjoined to the NP are also spelled-out. Since the Spell-Out of the adjuncts defines the linear order, the linear order is defined as follows:

- (68) Spell-Out (Sister of D1) yunomi  
 Linear Order: yunomi [vacuously defined]
- (69) Spell-Out(*marui* in <marui, yunomi>)  
 a. Linear Order: marui << yunomi  
 b. Mapping to  $\Phi$ : (yunomi)<sub>φ</sub>
- (70) Spell-Out (*omoi* in <omoi, <marui, yunomi>>)  
 a. Linear Order: omoi << marui << yunomi



b. Mapping to  $\Phi$ :  $(marui)_\phi$ 

Here, the linear order between *marui* and *yunomi* is determined first as in (69); otherwise *omoi* cannot be ordered with respect to *marui* or *yunomi*. Note that the ban on interpolation discussed in Chapter 1 blocks the reverse order. If (70) precedes (69), there will be interpolation: *marui* interpolates between *omoi* and *yunomi*.

Once the linear order is defined, the linear string in (69a) is sent to the phonological component, leaving the initial element *marui*, as in (69b). Then, the Spell-Out of *omoi* defines the linear order as in (70a), and the mapping takes place as in (70b), leaving the initial element *omoi*. As a result of these Spell-Outs, the following phonological phrasing is obtained in  $\Phi$ .

(71)  $(marui)_\phi (yunomi)_\phi$

Since  $(yunomi)_\phi$  violates the prosodic branching condition, it undergoes restructuring to the left:

(72)  $(marui)_\phi (yunomi)_\phi \rightarrow (marui\ yunomi)_\phi$

The next step is to spell-out *naomi* within DP2. Since it is the initial element within the domain of this Spell-Out, it is not mapped to  $\Phi$  at this point

The next step is to spell-out DP1. Linearization and Mapping take place in the following way:

- (73) a. C-Command Domain of D1:  $\langle D1, omoi \rangle_{C-COM}$   
 b. Rest:  $\langle DP2, D1 \rangle_{OCC}$   
 c. As a whole:  $DP2 \ll D1 \ll omoi$   
 d. Mapping to  $\Phi$ :  $(omoi)_\phi$

The linear order is defined as in (73c), and *omoi* is mapped to  $\Phi$ , as in (73d). DP2 escapes the mapping since it is the initial element here, and the Case particle, which should be bound to DP2 under (18b), is not realized in  $\Phi$  either.

- (74)  $(omoi)_\phi (marui\ yunomi)_\phi$

Here, no restructuring applies, since the second p-phrase consists of two phonological words.

Finally, *naomi*, which has escaped the mapping is mapped to  $\Phi$ , is mapped to  $\Phi$ , resulting in the following p-phrasing:

- (75)  $(naomi-no)_\phi (omoi)_\phi (marui\ yunomi)_\phi$

Here, the p-phrase containing *omoi* ‘heavy’ would be restructured to the left. However, in order to obtain the correct result, the restructuring of  $(omoi)_\phi$  into the preceding p-phrase needs to be blocked.

As the following example shows, the adjuncts may violate the prosodic branching condition in Japanese:

- (76) John-ga      kinoo      hon-o      yonda  
          John-Nom   yesterday   book-Acc   read(past)  
          (                    )<sub>φ</sub> (                    )<sub>φ</sub> (                    )<sub>φ</sub>  
          ‘John read a book yesterday’      (Adapted from Nagahara 1994)

Here,<sup>12</sup> the adjunct *kinoo* ‘yesterday’ corresponds to a single phonological phrase, violating the prosodic branching constraint. Note that the crucial difference between the Spell-Out of adjuncts and that of others is the way they define linear order. Specifiers, heads, and complements are linearly ordered in terms of OCC and C-Command among terminals, while adjuncts define the linear order on their own: When  $\alpha$  is adjoined to  $\beta$ ,  $\alpha$  precedes  $\beta$ . Then, it would not be unexpected that adjuncts show some different behavior in phonological phrasing. Therefore, I assume that Spell-Out of the adjuncts gives an instruction to  $\Phi$  so that the adjuncts are exempted from the prosodic branching condition.

Thus in (75),  $(\text{omoi})_{\phi}$  ‘heavy’ does not restructure into the preceding phonological phrase. Note that restructuring in (72) is not triggered by the adjunct *marui* ‘round’ but by *yunomi* ‘teacup.’ That is, even though the adjunct *marui* itself does not have to satisfy the prosodic branching condition, the nominal *yunomi* needs to satisfy it and the restructuring applies there.

In this section, I showed that the Kubozono’s paradigm in (13) can be accounted for derivationally. I also discussed how adjuncts are spelled-

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<sup>12</sup> The phonological phenomenon relevant to the phonological phrasing here is downstep since all the words in (76) are accented.

out and argued that they do not have to satisfy the prosodic branching condition.

### 3. Optionality of Phonological Phrasing

In this section, I speculate about optional phonological phrasing within the proposed framework.

Kubozono(1993: 165) observes the following optionality of the phonological phrasing:

(77) [[ naomi-no oi-no ] yome-no yunomi]  
 Naomi-Gen nephew-Gen wife-Gen teacup  
 ‘Naomi’s nephew’s wife’s teacup’

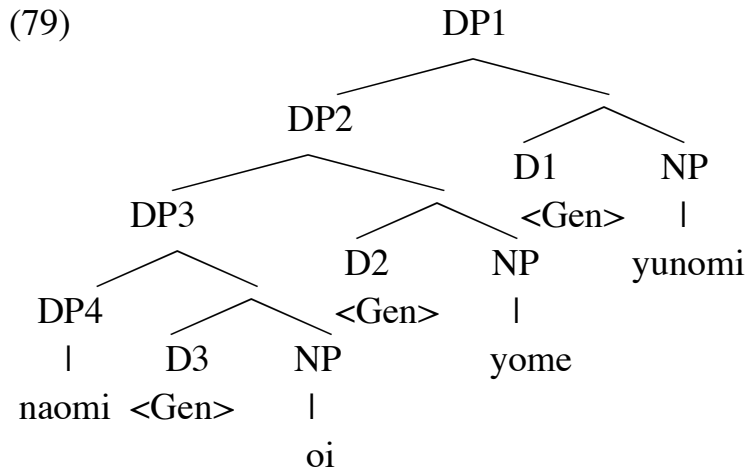
(78) a. AB/CD  $\underline{\text{na}}\overline{\text{omino}} \text{ oino } \underline{\text{yo}}\overline{\text{meno}} \text{ yunomi}$   
 ( ) ( )

b. A/BCD  $\underline{\text{na}}\overline{\text{omino}} \text{ o}\overline{\text{ino}} \text{ yomeno } \text{yunomi}$   
 ( ) ( )

c. A/B/CD  $\underline{\text{na}}\overline{\text{omino}} \text{ o}\overline{\text{ino}} \underline{\text{yo}}\overline{\text{meno}} \text{ yunomi}$   
 ( ) ( ) ( )

(77) show the phonological phrasings shown in (78) optionally.

The syntactic structure of (77) is shown below:



Here, DP4 is in the phase edge of DP3, which is in the phase edge of DP2, which is in the phase edge of DP1. Let us apply the proposed mapping algorithm:

- (80) a. S-O(Sister of Head of DP4):  $(naomi)_\phi$   
 b. S-O(Sister of D3):  $(oi)_\phi$   
 c. S-O(Sister of D2):  $(yome)_\phi$   
 d. S-O of (Sister of D1):  $(yunomi)_\phi$   
 e. S-O(DP1 as part of a larger structure):  $(-no -no -no)$
- i. Linearization within DP3 :  $(naomi-no)_\phi (oi)_\phi$   
 Restructuring in  $\Phi$ :  $(naomi-no oi)_\phi$
- ii. Linearization within DP2:  $(naomi-no oi-no)_\phi (yome)_\phi$   
 Restructuring in  $\Phi$ :  $(naomi-no oi-no yome)_\phi$
- iii. Linearization within D1:  
 $(naomi-no oi-no yome-no)_\phi (yunomi)_\phi$   
 Restructuring in  $\Phi$ :  
 $(naomi-no oi-no yome-no yunomi)_\phi$

In the first four steps (80a)-(80d), each noun is spelled-out as a sister of D. Since all the D's are not spelled-out here, the spelled-out phrases are not linearly ordered, and therefore no phonological phrases are formed until step (80e). In (80e), DP1 is spelled-out as part of a larger structure, and DP2, DP3, and DP4 are also spelled-out as part of DP1. Then, first, the linear order within DP3 is determined, and the linearly ordered string is mapped to  $\Phi$ , and undergo the restructuring, as in (80e.i.), and the same process applies within DP2, as in (80e.ii), and then within DP1, as in (80e.iii). Then, the resulting phonological phrase is (naomi-no oi-no yome-no yunomi) <sub>$\Phi$</sub> , which is wrong.<sup>13</sup>

As the optionality in the phonological phrasing suggests, we would need some additional account here. Note that since the three DP's are in the phase edges, they are not spelled-out until the entire structure, DP1 as a whole, is spelled-out. I suggest that a DP embedded in another DP is taken to be a root if the embedding is "very deep," and undergoes Spell-Out at some earlier point of the derivation.

The general idea behind the notion of Multiple Spell-Out is computational efficiency. That is, computational system is "forgetful" and the multiple application of Spell-Out reduces the computational burden by "forgetting" the spelled-out domain. If so, the DP's that remain spelled-out in the edge of the other DP phase would create an unwanted computational burden because the uninterpretable features in each DP remain checked "for a long time" under the assumption that Agree is part of Spell-Out/Transfer (Chomsky 2001b: 16). Thus, if DP2 and DP3 are

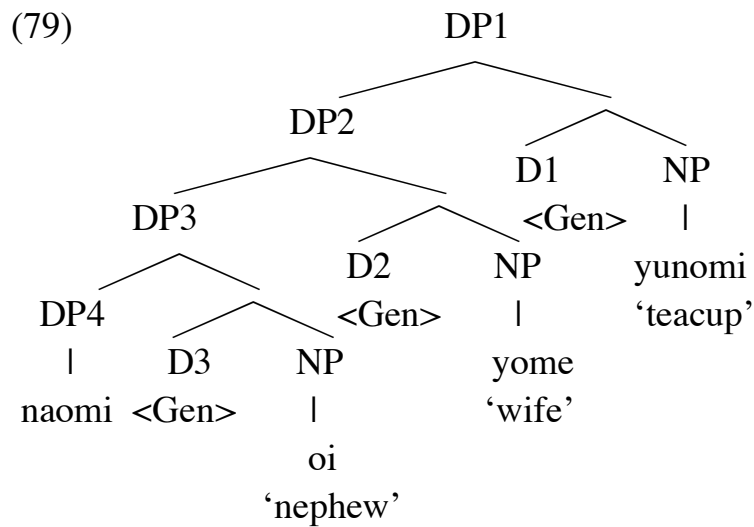
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<sup>13</sup> Kubozono's (1993) Branching Constraint hypothesis also predicts that entire phrase is a single phonological phrase.

spelled-out as part of DP1, we will need to locate at least three probes in different heads, D1, D2, and D3, which are scattered on a single representation when Spell-Out applies.

I suggest that DP's that remain spelled-out in the phase edge are taken to be roots in computation to reduce the burden of computation, and Spell-Out applies to such roots. I will call such Spell-Out *forced Spell-Out*.

Under these considerations, let us return to (79), repeated here:



Let us consider the first four steps of the derivation (80a-d) again.

- (71) a. S-O(Sister of Head of DP4): (naomi)<sub>φ</sub>  
 b. S-O(Sister of D3): (oi)<sub>φ</sub>  
 c. S-O(Sister of D2): (yome)<sub>φ</sub>  
 d. S-O of (Sister of D1): (yunomi)<sub>φ</sub>

At this point, we have three DP phases that are not spelled-out in the edge positions. Suppose that DP4 is taken to be a root. Then, *naomi* is forced to be mapped to  $\Phi$  independently.

(81) (naomi)<sub>φ</sub>

When D3 is spelled out as part of the Spell-Out of the entire DP1, the Case particle is bound to *naomi* under (18b):

(82) (naomi-no)<sub>φ</sub>

Suppose that the p-phrase resulting from the forced Spell-Out resists the restructuring since it has been spelled-out as an independent root. Then the phrasing (78b) is obtained as a result of the forced Spell-Out of DP4.

Similarly, if DP3 is taken to be a root and undergoes forced Spell-Out, then a p-phrase corresponding to DP3 resists the restructuring. Note that the restructuring within the DP3 is not blocked. Therefore, (naomi-no) and (oi) are phrased together, and (78a) is obtained. If each of DP4 and DP3 is taken to be a root, then the phrasing in (78c) is obtained. Note that DP2 may not be taken to be a root perhaps because it is not deep enough to be taken to be a root.

If this line of approach is correct, then it lends a support for the general algorithm of phonological phrasing in terms of Multiple Spell-Out. Multiple Spell-Out in combination with appropriate economy considerations gives a reason to take a phrase to be a root, and such a root



corresponds to a phonological phrase which is a reflex of Multiple Spell-Out.<sup>14</sup>

#### 4. Summary

In this chapter, I argued for a derivational approach to phonological phrasing, by showing that the restructuring reflects the syntactic cycle. It is important to notice that a derivational approach makes it possible to apply the restructuring without recourse to any syntactic information. That is, a derivational approach makes it possible to achieve a very restrictive theory of syntax-phonology mapping. It is also important to notice that the arguments made in this chapter are a support for a derivational theory in general.

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<sup>14</sup> Note that this kind of reanalysis of a certain phrase as a root would be related to the intonational structure of the multiple embedding in English discussed by Chomsky and Halle (1968: 372):

(i) This is the cat that caught the rat that stole the cheese

The intonational pattern of this sentence is *this is the cat - that caught the rat - that stole the cheese*, where each CP phase seems to be taken to be a root. Thanks to John Bowers and John Whitman for bringing this to my attention.

## CHAPTER FOUR

### FOCUS AND PHONOLOGICAL PHRASING IN KIYAKA AND SANDAWE

#### 1. Introduction

In this chapter, I give an analysis of phonological phrasing in focus constructions in KiYaka and Sandawe within the derivational approach to the syntax-phonology mapping developed so far. I show that those constructions are accounted for under the assumption that the initial element escapes the mapping to the phonological component (see Chapter 1), and that Focus Phrase in the expanded left-peripheral system is a strong phase (Rizzi 1997).

In section 2, I discuss KiYaka (Kidima 1990, 1991). Assuming that there is a focus phrase FocP above IP (Frascarelli 2000, Nakamura 1994, Rizzi 1997), I give a syntactic analysis of the preverbal and postverbal focus constructions. I propose that FocP is a strong phase, and give an account for phonological phrasing in focus constructions. In section 3, I discuss Sandawe. I give an analysis of the word order variation with special references to the phonological phrasing. Sandawe is an SOV language, but the word order is apparently free. It allows multiple focus constructions, and the word order is in fact restricted by the presence of focus (Kagaya 1990). I propose that there is a FocP internal to IP, in addition to the FocP above IP (Jayaseelan 2001, Ndayiragije 1999), and give an account of the word order and phonological phrasing.

## 2. KiYaka

In this section, I discuss focus and its effect on phonological phrasing in KiYaka (Bantu). All the data come from Kidima's (1990, 1991) work.

### 2.1 Basic Syntactic Properties of KiYaka

KiYaka is an SVO language. It shows some word order variation depending on the discourse context. The subject agreement or the Subject Marker on the verb is obligatory in a finite clause, and the object agreement or the Object Marker is "optional" in the sense that it may or may not appear on the verb to give a grammatical sentence. The presence/absence of the Object Marker, as well as focus, shows an interesting correlation with the word order and phonological phrasing, as we will see below.

### 2.2 Phonological Rule

Kidima (1990, 1991) shows that KiYaka has the following phonological rule that applies across word boundaries within a phonological phrase:

(1) Plateauing (left to right, iterative)

$$\begin{array}{c}
 [\dots V \dots V \dots V \dots] \\
 \begin{array}{ccc}
 & \text{-----} & | \\
 & \text{L} & \text{H}
 \end{array} \\
 [ \quad H \quad \quad H \quad ]\phi \quad (\text{Kidima 1991: 44, Kidima 1990: 201})
 \end{array}$$

This rule spreads a linked H tone to all the toneless morae on its right until another linked H tone is reached. The application of the rule is illustrated below:

- (2) a. baaná ba-ba-súumbidi bakhokó  
 children they-them-bought chickens Kidima (1991: 176)
- b. baaná ba-suúmbidí bákhoóko  
 children SM-bought chickens Kidima (1991: 171)

Note that the raised H, such as “á,” shows up if a H tone is linked to an accented syllable. So a H tone and a raised H can be taken to be a H in the application of (1). See Kidima (1990, 1991) for the details of tonal phenomena in KiYaka. In (2a), the first mora of the verb stem and the last mora of the object noun have a (raised) H tone. However, the H on the verb stem does not spread to the right, indicating that the verb and the object do not belong to the same phonological phrase. In contrast, in (2b) the H tone on the verb stem, which is realized as a raised H, spreads to the right across the word boundary, and the first and the second morae of the object ‘chicken’ are realized as H tones. That is, the verb and the object are phonologically phrased together in (2b).

### 2.3 Examples without Focus

In this section, I discuss the phonological phrasing in the examples where there is no focus involved. Kidima (1991:175) calls the context in which such phonological phrasing is observed “Non-Focused Old Information.” In this context, all the arguments are old information, and the sentences can be uttered as the answer to a yes/no question, according to Kidima (1991:175). The following examples are possible answers to the question “Did the children buy the chickens?”:

- (3) a. baaná ba-ba-súumbidi bakhokó  
 children they-them-bought chickens  
 ( )<sub>φ</sub> ( )<sub>φ</sub>( )<sub>φ</sub> S-V-O  
 ‘The children DID buy the chickens’  
 (lit. As for the children, they did buy the chickens)
- b. baaná bakhokó ba-ba-súumbidi  
 children chickens they-them-bought S-O-V  
 ( )<sub>φ</sub> ( )<sub>φ</sub>( )<sub>φ</sub>
- c. ba-ba-súumbidi baaná bakhokó  
 they-them-bought children chickens V-S-O  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>
- d. ba-ba-súumbidi bakhokó baaná  
 they-them-bought chickens children V-O-S  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>
- e. bakhokó baaná ba-ba-súumbidi  
 chickens children they-them-bought O-S-V  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>
- f. bakhokó ba-ba-súumbidi baaná  
 chickens they-them-bought children O-V-S  
 ( )<sub>φ</sub> ( )<sub>φ</sub>( )<sub>φ</sub>

Kidima (1991: 176)

Here and below, I show the phonological phrasing by round brackets under the glosses in each example. As the above examples show, all the





### 2.4.2 Postverbal Focus

Let us first consider the case where the object is a postverbal focus. Kidima (1991: 170) describes the context in which this construction is used as follows: “..., the family went to the market. When they got there, they saw both ducks and chickens for sale. But the children bought chickens. In this example, ‘chickens’ is focused old information. The utterance can be part of a narrative or not. Constructions of this type generally express surprise, disappointment, or something unexpected for the postverbal argument.” He shows the following example in this context:

- (6) a. *baaná ba-suúmbídí bákhóko* S-V-O  
 children SM-bought chickens  
 ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ‘The children bought chickens.’
- b. *ba-suúmbídí bákhóko baaná* V-O-S  
 SM-bought chickens children  
 ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ‘The children bought chickens.’ Kidima (1991: 171)

The focused object is phonologically phrased with the preceding verb. The non-focused subject is phrased alone, and precedes the verb as in (6a) or follows the focused object as in (6b). The verb does not bear an Object Marker. Note that in this context, no other constituent may intervene between the verb and the focused object (Kidima 1991: 171).



Let us next consider the examples where the subject is focused.

Kidima (1991: 171) describes the context as follows: "... the parents and the children were competing for the purchase and the children finally won the contest: THE CHILDREN bought the chickens (but not the parents)."

And he shows the following examples:

(7) a. *ba-ba-súúmbídí bááná bakhokó V-S-O*

SM-OM-bought children chickens

( )<sub>φ</sub> ( )<sub>φ</sub>

'THE CHILDREN bought the chickens'

b. *bakhokó ba-ba-súúmbídí bááná O-V-S*

chickens SM-OM-bought children

( )<sub>φ</sub> ( )<sub>φ</sub>

'THE CHILDREN bought the chickens' Kidima (1991: 171-2)

The focused subject follows the verb, and it is phonologically phrased with the verb. The non-focused object follows the focused object as in (7a) or precedes the verb as in (7b). No other element may intervene between the verb and the focused subject (Kidima 1991: 172). Note that the Object Marker is obligatory in (7). Kidima (1991: 171) notes that the reading in (7) "requires that the object be backgrounded and this is indicated by the obligatory object agreement (second *ba-*) in the verbal unit." I will discuss the relation between the Object Marker and its interpretation in section 2.5.1.

### **2.4.3 Summary**

In this section, I introduced Kidima's (1991) data of the non-focused constructions, the preverbal focus constructions, and the postverbal focus constructions.<sup>1</sup> In the non-focused constructions, the verb bears the Object Marker, and the word order is free. In the preverbal focus constructions, the preverbal focus and the verb are phonologically phrased together. In the post-verbal focus constructions, the postverbal focus is phonologically phrased with the verb. In both focus constructions, the non-focused argument is phonologically phrased alone, and the verb bears the Object Marker if the subject is focused while it does not if the object is focused.

## **2.5. Assumptions**

### **2.5.1 Subject Marker and Object Marker**

In order to give a specific analysis of KiYaka phrase structure which serves as a basis for the analysis of phonological phrasing, let us first consider Chichewa (Bantu), whose syntactic properties have been studied in more detail by Bresnan and Mchombo (1987), Bresnan and Kanerva

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<sup>1</sup> Kidima (1991) discusses two other contexts: Non-focused New Information and Multifocused New Information. In the former, the utterance is made as an answer to a question such as "What happened, then?" According to Kidima, the arguments (subject and object) used in this context are presupposed. The subject, object and verb are phrased separately, and the object must follow the verb. Thus, SVO, VOS and VSO are possible. Object Marker does not show up. In the latter context, the utterance is made as an answer to a question such as "What happened." According to Kidima, the arguments are new information in this context. Only SVO order is allowed, and they are all phonologically phrased together.

(1989), among others. As I will show below, KiYaka has syntactic properties similar Chichewa.

Like KiYaka, Chichewa shows the following word order variation in transitive constructions where the verb bears the Object Marker (see (3) for KiYaka data):

- (8) a. njûchi zi-ná-wá-lum-a alenje (Chichewa)  
       bees SM-Past-OM-bite-Ind hunters  
       ‘The bees bit them, the hunters.’  
       b. zináwáluma alenje njûchi  
       c. alenje zináwáluma njûchi  
       d. zináwáluma njûchi alenje  
       e. njûchi alenje zináwáluma  
       f. alenje njûchi zináwáluma Bresnan and Mchombo (1987: 747)

Bresnan and Mchombo (1987: 745) argue that the Subject Marker is ambiguously used as grammatical agreement and anaphoric pronoun, while the Object Marker is unambiguously used as an incorporated pronoun which is anaphorically linked to the topic NPs. If the Subject Marker is used as grammatical agreement, then the subject NP has to occur in a position local to the verb. If the Subject Marker is used as an anaphoric pronoun, it is anaphorically linked to a topic like the Object Marker (Bresnan and Mchombo 1987: 755). They assume that a topic NP is generated under S in the following structure:



- (11) Ndikufúná kutí áná ánga a-pitirez-é phúnziro  
 I-want that children my SM-continue-Subjn lesson  
 ‘I want my children to continue the lesson.’

Bresnan and Mchombo (1987: 750)

Here, the verb ‘continue’ does not bear the Object Marker and therefore the object *phúnziro* ‘lesson’ is not a topic. Roughly put, in Chichewa, the H tone on the final vowel of the verb is retracted to the penultimate if no other element follows it within VP or within a phonological phrase that corresponds to VP (see also Bresnan and Kanerva 1989, Kanerva 1990).<sup>2</sup> In (11), the H tone on the verb is not retracted, indicating that the object is within VP. Note that the branchingness of the object, discussed in Chapter 2, is irrelevant to the phonological phrasing of the verb and the object in Chichewa:

- (12) a. Mwaána anaményá nyuúmba  
 child SM-hit house  
 ‘The child hit the house’  
 b. Mwaána anaményá nyumbá ya bwiíno  
 child SM-hit house of good  
 ‘The child hit the good house.’ Sam Mchombo (p.c.)

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<sup>2</sup> In Chichewa, Penultimate Lengthening, Nonfinal Doubling and Prehigh Doubling are also sensitive to phonological phrasing (see Bresnan and Kanerva 1989, Kanerva 1990).

Here, the verb does not bear the Object Marker and the H tone on the verb is not retracted in the presence of the object. If it were retracted, we would have *anaméenya* (See Kanerva 1990).

In contrast, if the verb ‘continue’ bears an Object Marker, the H tone on the verb is retracted:

- (13) Ndikufúná kutí áná      ánga a-li-pítírize                      phunziro  
 I-want      that children my SM-OM-continue-Subjn lesson  
 ‘I want my children to continue it, the lesson.’

Bresnan and Mchombo (1987: 750)

The presence of tone retraction on the verb indicates that the topic object NP following the verb is outside of the VP, or outside of the phonological phrase corresponding to the VP. This conforms to the assumption that a topic NP is generated under S, but not under VP.<sup>3</sup>

In sum, if the verb bears the Object Marker which is unambiguously an incorporated pronoun, the NP that is anaphorically linked to it is unambiguously a topic.

Now, let us return to KiYaka. As we have seen in KiYaka examples (3), (5) and (7), the object NP is phonologically phrased alone if the verb bears an Object Marker. As Kidima (1991: 171) notes (see section 2.4.2), the object is interpreted as a background information, indicating that it is a topic. Therefore, I assume that the Object Marker is an incorporated

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<sup>3</sup> It is difficult to gain phonological evidence concerning the position of the subject since the subject is phonologically phrased separately from the

pronoun, and not grammatical agreement, in KiYaka. I also assume that the Subject Marker is ambiguously used as an incorporated pronoun and grammatical agreement in KiYaka.

(14) *KiYaka*:

- a. Subject Marker is used ambiguously as grammatical agreement or anaphoric pronoun.
- b. Object Marker is an incorporated pronoun, used unambiguously as anaphoric pronoun.
- c. Object Marker is anaphorically linked to a topic NP/DP.

I make the following specific assumptions about the Object Marker and the object NP. I assume that  $v$  has an OCC feature in KiYaka:

(15)  $v$  has an OCC feature in KiYaka.

Suppose that the incorporation of the object pronoun is triggered by the OCC feature. Thus, the OCC feature of  $v$  is checked by a pronoun, which shows up as an Object Marker within the verbal morphology.

If the verb does not bear the Object Marker, then the OCC feature of  $v$  has to be checked by some other element than the (incorporated) pronoun. I suggest that the object NP checks it when there is no Object Marker. Therefore, the OCC feature of  $v$  is checked either by the (incorporated) pronoun or the object NP.

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verb for independent reasons. See Chapter 1. The subject is not phrased with the following verb regardless of its topichood.

Suppose that this is also true in Chichewa. Then the fact that the verb and the object are phonologically phrased together in the absence of the Object Marker as in (12a) is accounted for in the following manner. The phrase structure looks like (16):

(16) [<sub>CP</sub> C [<sub>IP</sub> child hit-*v*-Infl [<sub>vP</sub> house <*v*> [<sub>vP</sub> <hit> <house>]]]]

The object ‘house’ moves to the Spec of *vP* and checks the OCC feature of *v*. I assume that the verb ‘hit’ moves to adjoin to *v*, and the *v*, to which the verb ‘hit’ adjoins, moves to adjoin Infl (Kinyalolo 1991:35ff.). When Spell-Out applies to the sister of C, the subject escapes the mapping to the phonological component  $\Phi$ , and the verb in Infl and the object in the Spec of *vP* are mapped to  $\Phi$  together within the proposed theory of syntax-phonology mapping (Chapter 1, see also the analysis of Kimatuumbi and SOV word order in Ewe in Chapter 2). Therefore, they form a single phonological phrase, in which the verb occupies the non-final position, and hence no tone retraction.

### 2.5.2 Topic and Focus

In this section, I introduce some assumptions about topic and focus.

Frascarelli (2000) observes that the focus constructions show the following intonational phrasing in Italian (here XP = focused constituent):

- (17) a. (Topic)<sub>I</sub> (XP Verb)<sub>I</sub> (Topic)<sub>I</sub>  
       b. (Topic)<sub>I</sub> (Verb XP)<sub>I</sub> (Topic)<sub>I</sub>                   (Frascarelli 2000: 83)



XP, a focused constituent, precedes the verb in (17a), and follows the verb in (17b). I call (17a) a preverbal focus construction and (17b) a postverbal focus construction. XP and the verb are intonationally phrased together in both cases, and the other (non-focused) elements are topicalized and correspond to independent intonational phrases.

Frascarelli proposes that there are Topic Phrase and Focus Phrase above IP:

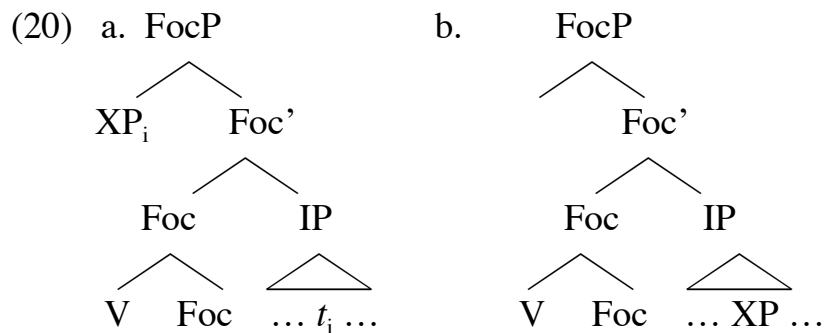
(18)  $[_{\text{TopP}} \dots [_{\text{FocP}} \dots [_{\text{IP}} \dots$

(Frascarelli 2000, cf. Nakamura 1994, Rizzi 1997)

Here, TopP can be iterative. She proposes that the verb moves to the head of FocP in focus constructions:

(19) V moves to Foc.

The focused XP moves to the Spec of FocP in preverbal focus constructions as in (20a), and it remains in-situ in postverbal focus constructions as in (20b):



Frascarelli (2000: 87)

She assumes that the non-focused elements undergo topicalization in the focus constructions, and that the topicalized element is base-generated in TopP. She proposes the following condition on syntax-phonology mapping:

- (21) A constituent in the Spec of TopP corresponds to an intonational phrase. (adapted from Frascarelli 2000: 208)

In KiYaka, it is not clear whether the relevant phonological rule, Plateauing in (1), is an intonational phrase phenomenon or not. However, following Kidima's (1991) original proposals, I assume that it is indeed phonological phrase phenomenon. Frascarelli (2000: 2.4.2; 2.6) shows that an intonational phrase may (optionally) undergo restructuring to the neighboring intonational phrase if it is non-branching in Italian. As a result of the restructuring, two intonational phrases are merged into one, but a phonological phrase boundary is not affected by the restructuring.

- (22) *Restructuring of Intonational Phrases:*

$$(( \quad )_{\phi})_I (( \quad )_{\phi})_I \rightarrow (( \quad )_{\phi} ( \quad )_{\phi})_I$$

KiYaka data in (3), for example, show that even the non-branching topic constitutes a prosodic domain for the relevant phonological rule. If the branchingness of a topic is relevant for the intonational phrasing in KiYaka, and if the relevant phonological rule is intonational phrase phenomenon, then it might be expected that non-branching topics in (3) would be intonationally phrased with the neighboring intonational phrase,

extending the prosodic domain of the relevant phonological rule.

However, a non-branching topic still corresponds to a relevant prosodic domain in KiYaka. Under the assumption that the relevant phonological rule is a phonological phrase phenomenon, even if the restructuring of intonational phrasing occurs in KiYaka, the phonological phrase boundary is maintained. That is, a topic always corresponds to a phonological phrase irrespective of whether it is branching or not, or whether non-branching topic undergoes the restructuring of intonational phrase or not. Therefore, I assume that a topic corresponds to an intonational phrase in KiYaka, and that the Plateauing is a phonological phrase phenomenon.

## 2.6 An Analysis of KiYaka Phonological Phrasing

### 2.6.1 Examples without Focus

In this section, I give an account of the phonological phrasing of the examples where there is no focus. The essence of the analysis presented here is the same as the ones proposed by Bresnan and Mchombo (1987:section 2) and Frascarelli (2000). The data are repeated below:

- (3) a. baaná ba-ba-súumbidi bakhokó  
 children they-them-bought chickens  
 ( )<sub>φ</sub> ( )<sub>φ</sub>( )<sub>φ</sub> S-V-O  
 ‘The children DID buy the chickens’
- b. baaná bakhokó ba-ba-súumbidi  
 children chickens they-them-bought S-O-V  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>

c.	ba-ba-súumbidi	baaná	bakhokó	
	they-them-bought	children	chickens	V-S-O
	(                    ) <sub>φ</sub>	(            ) <sub>φ</sub>	(            ) <sub>φ</sub>	
d.	ba-ba-súumbidi	bakhokó	baaná	
	they-them-bought	chickens	children	V-O-S
	(                    ) <sub>φ</sub>	(            ) <sub>φ</sub>	(            ) <sub>φ</sub>	
e.	bakhokó	baaná	ba-ba-súumbidi	
	chickens	children	they-them-bought	O-S-V
	(            ) <sub>φ</sub>	(            ) <sub>φ</sub>	(                    ) <sub>φ</sub>	
f.	bakhokó	ba-ba-súumbidi	baaná	
	chickens	they-them-bought	children	O-V-S
	(            ) <sub>φ</sub>	(                    ) <sub>φ</sub>	(            ) <sub>φ</sub>	

Here, any word order is possible and each of the subject, the verb and the object corresponds to a phonological phrase. The Object Marker, as well as the Subject Marker, is obligatory in these constructions.

Since both the subject and the object are old information in this context, I assume that they are topics. The assumption that the object is a topic in this context is supported by the fact that the Object Marker is obligatory.

Following Rizzi (1997) and Frascarelli (2000), I assume that a topic phrase (TopP) is generated (iteratively, if necessary) above IP:

(23) TopP\* IP

I assume that the subject and the object are base-generated in the Spec of TopP, and anaphorically linked to the Subject and Object Markers on the verb.

Let us first consider the word orders SOV and OSV. Since the subject and the object are topics, they are base-generated in the Spec of TopP:

- (24) a. [<sub>TopP</sub> **Subj** Top [<sub>TopP</sub> **Obj** Top [<sub>IP</sub> ... **V** ... ]]] SOV  
 b. [<sub>TopP</sub> **Obj** Top [<sub>TopP</sub> **Subj** Top [<sub>IP</sub> ... **V** ... ]]] OSV

In these examples, there are two TopP's. In (24a), the subject and the object are generated in the higher TopP and the lower TopP, respectively. In (24b), the subject is in the lower TopP and the object is in the higher TopP. From these positions, they are anaphorically linked to the Subject and Object markers on the verb. Given the assumption (21) that the topic corresponds to an intonational phrase, the subject and the object are mapped to their own intonational phrases. And the rest of the structure, i.e., the verb, is mapped to its own intonational phrase. Therefore, each of the subject, the object, and the verb corresponds to a phonological phrase.

Let us next consider the other word orders. In order to derive the other word orders, it is necessary to move a constituent containing the verb to a position preceding a TopP. I assume that IP undergoes movement to a functional category XP which is posited above a TopP (see Frascarelli 2000):

- (25) a. [<sub>TopP</sub> **Subj** Top [<sub>XP</sub> [<sub>IP</sub> ... **V** ... ] X [<sub>TopP</sub> **Obj** Top <IP>]] SVO  
 b. [<sub>XP</sub> [<sub>IP</sub> ... **V** ... ] X [<sub>TopP</sub> **Subj** Top [<sub>TopP</sub> **Obj** Top <IP>]]] VSO





- (27) a. V moves to Foc.  
 b. A focused constituent moves to Spec of FocP.

Furthermore, I propose that the FocP is a strong phase in the articulated left-peripheral system:

- (28) FocP is a strong phase.

Thus, the sister of the head of FocP undergoes Spell-Out.

I also adopt the following assumption:

- (29) The element in the Spec of FocP receives a H tone.

This is intended to account for the fact that the preverbal focus receives a H tone.<sup>4</sup>

Now, let us consider the phonological phrasing of the preverbal focus constructions. First, let us consider (5b), which can be uttered as an answer to “Who bought the chickens?”:

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<sup>4</sup> Kidima 1991 analyses the H tone as a copula, and argues that the preverbal focus construction is a cleft construction. Note that in some languages, focus markers are used as copulas. Thus in Wolof, *lë* is used as a focus marker in (i), and as a copula in (ii):

- (i) Yàpp lë-y                    Hara di lekk.  
       meat Foc.3sg.-Asp Hara Asp eat  
       ‘Hara is eating meat (It is meat that Hara is eating)’
- (ii) Doktoor lë                Hara  
       doctor Foc.3sg. Hara  
       ‘Hara is a doctor.’

I assume that both a copula and a focus marker are associated with FocP.



- (5b) bakhokó baáńá bá-bá-súumbidi  
 chickens cop-children they-them-bought  
 ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ‘THE CHILDREN bought the chickens’

Here, the subject is focused. Under (27), the subject and the verb move to Spec of FocP, and Foc, respectively. The object NP is a topic generated in the Spec of TopP:

- (30) [<sub>TopP</sub> chickens Top [<sub>FocP</sub> children V-Foc [<sub>IP</sub> ... ]]]

Under (29), ‘children’ in the Spec of FocP receives a H tone. Since FocP is a strong phase, IP is spelled-out. Since the spec and the head of FocP are edges of the phase, they are spelled-out together at the next Spell-Out. Under (21), the topic ‘chickens’ corresponds to an intonational phrase. Therefore, the focused subject and the verb are phrased together, while the topic ‘chickens’ is phrased alone.

Note that since I am assuming that FocP is part of the left periphery or expanded CP (cf. Rizzi 1997), the next Spell-Out should be Spell-Out of the root or the rest of the whole structure. The initial element in the domain of the Spell-Out of the root does not have to escape the mapping to the phonological component, because the Assembly Problem pointed out in Chapter 1 does not arise. Therefore, the focused subject and the verb in the edge of the FocP are sent to the phonological component together, and correspond to a single phonological phrase even if the overt topic is not present.







subject, then the subject moves to the Spec of IP. Suppose that this holds in KiYaka. Then in (7), the subject has to move to Spec of IP under Agreement Parameter since the Subject Marker on the verb is grammatical agreement.

(33)  $[_{IP} \text{ Subj Infl } [_{vP} \langle \text{Subj} \rangle v [_{VP} \dots ]]$

I adopt the assumption (27a) that the verb moves to the head of FocP for the postverbal focus constructions (as proposed by Frascarelli 2000 for Italian postverbal focus constructions).

(34)  $[_{FocP} \text{ V-}v\text{-Infl-Foc } [_{IP} \text{ Subj } \langle \text{V-}v\text{-Infl} \rangle [_{vP} \dots ]]$

Then, the fact that V precedes the subject indicates that the subject does not move to the Spec of FocP, but stays in the Spec of IP:

(35)  $[_{FocP} \text{ V-}v\text{-Infl-Foc } [_{IP} \text{ Subj } \langle \text{V-}v\text{-Infl} \rangle [_{vP} \dots ]]$

Under these considerations, the sentence (7b) has the following structure:

(36)  $[_{TopP} \text{ chickens Top } [_{FocP} \text{ bought-}v\text{-Infl-Foc } [_{IP} \text{ children } \langle \text{Infl} \rangle [ \dots ] ]]$

Here, the subject ‘children’ moves to the Spec of Infl due to the Agreement Parameter since the verb shows the grammatical agreement with the subject. Under the assumption in (27a), V moves to Foc (pied-

pping  $v$  and Infl, given that the excorporation is disallowed). As a result, the verb precedes the subject. The topic object ‘chickens’ is generated in the Spec of TopP. I assume that the focus interpretation of the subject is licensed by Foc under c-command (cf. Frascarelli 2000: 88).<sup>5</sup>

Suppose that FocP is a strong phase, as I suggested in (28). Then, IP is spelled-out.

Recall that in the proposed theory of the syntax-phonology interface (see Chapter 1), the initial element in the domain of Spell-Out escapes the mapping to the phonological component. It is mapped to the phonological component at the next Spell-Out. In (36), the initial element in the domain of Spell-Out of the sister of Foc is the subject ‘children.’

Therefore, the verb adjoined to Foc and the subject in the Spec of IP are sent to the phonological component together at the next Spell-Out, corresponding to a single phonological phrase:

(37) (bought children)<sub>φ</sub>

Within this domain, the phonological rule Plateauing applies. In this way, the fact that the verb and the postverbal subject are phrased together is accounted for.

Now, let us consider the case where the object is a postverbal focus.

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<sup>5</sup> Frascarelli (2000) argues that focus involves feature-checking. More specifically, a verb that is adjoined to Foc has a focus feature, and it is checked by a focused constituent. Here I assume that Foc itself has a focus feature, which is checked by the focused constituent under c-command. As we will see in the next section, the verb does not move to Foc in Sandawe.

- (6) a. *baaná ba-suúmbíđí bák hóko* S-V-O  
 children SM-bought chickens  
 ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ‘The children bought chickens.’
- b. *ba-suúmbíđí bák hóko baaná* V-O-S  
 SM-bought chickens children  
 ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ‘The children bought chickens.’

Here, the verb is phonologically phrased with the focused object, and it does not bear an Object Marker. Assuming that the *v* has an OCC feature (see (15)), the object ‘chickens’ moves to the Spec of *v*P. The Subject Marker on the verb is an incorporated pronoun since the subject is a topic in this context:

- (38) [<sub>TopP</sub> children Top [<sub>FocP</sub> V-*v*-Infl-Foc [<sub>IP</sub> <V-*v*-Infl>  
 [<sub>vP</sub> chickens <V-*v*> [<sub>VP</sub> ...]]]]]

Suppose that the IP is spelled-out in this structure. Then it would be predicted that the V in Foc is not phrased with the object in the Spec of *v*P since the object is not the initial element in the domain of this Spell-Out.

I suggest two possible solutions for this problem. First, suppose that Infl is paired with a phase head when a lexical array or numeration is formed. Thus, if it is paired with a declarative C/Force (Rizzi 1997), a sentence without a focus is obtained. If it is paired with Foc, then a

sentence with a focus is obtained. Suppose also that formal features such as an OCC feature are the properties of the pair of these categories, but not the properties of each category. Thus, a pair of C and Infl has OCC and (uninterpretable) phi-features. When these categories are introduced into syntax, those features are carried by one or the other category. Thus, in the case of a pair of C and Infl, both of those features are carried by Infl when it is introduced into syntax.

Suppose that a pair of Foc and Infl has phi-features, a [focus]-feature and two OCC features in the lexical array.

(39) Foc-Infl pair has a [focus]-feature, phi-features, and two OCC features.

If OCC and [focus]-features are carried by Foc, and if another OCC feature and phi-features are carried by Infl, then we will have a preverbal focus constructions. Thus, if the object is focused, the subject pronoun is incorporated into Infl and checks the OCC and phi-features of Infl, and the focused object moves to Spec-FocP and checks the OCC and [focus]-features of Foc. If the subject is focused, the subject moves to Spec-IP, where it checks OCC and phi-features of Infl, and then it moves on to Spec-FocP, where it checks OCC and [focus]-features of Foc.

Suppose that the Foc-Infl pair has the feature content as described in (39) even in the postverbal focus constructions. It is clear that Foc does not have an OCC feature, since a focused element does not move to the Spec of FocP. Then, Infl must have two OCC features. Suppose so. If the object is focused, the subject pronoun (to be incorporated) checks the



OCC and phi-features on Infl. At this point, another OCC feature remains to be checked. I suggest that it is checked by the object to be focused. If this approach is on the right track, then the object ‘chickens’ moves to the Spec of IP to check the OCC feature of Infl, as in (40):

- (40) [<sub>TopP</sub> children Top [<sub>FocP</sub> V-v-Infl-Foc [<sub>IP</sub> chickens <V-v-Infl>  
 [<sub>vP</sub> <chickens> <V-v> [<sub>vP</sub> ...]]]]]

When the sister of Foc is spelled-out, ‘chickens’ in the Spec of IP are not mapped to the phonological component since it is the initial element in the domain of Spell-Out. It is phonologically phrased with the verb when Spell-Out applies to the root of the clause. Note that ‘children’ is phonologically phrased alone since it is a topic.

Under this approach, let us reconsider the postverbal subject focus constructions. I am assuming that Infl has two OCC features and a set of uninterpretable phi-features. First, the subject moves into the Spec-IP and checks the phi-features and one OCC feature. At this point, another OCC feature remains checked. Since the Subject Marker is grammatical agreement in this construction, the OCC feature cannot be checked by the pronoun incorporation. That is, one OCC feature is redundant here. Note that the object cannot check the OCC feature either because it is topicalized in this construction.

However, such redundancy would be expected in the case of subject focus. In the literature, it is observed that a focused subject induces a

reduced form of agreement in some languages (*Anti-agreement*).<sup>6</sup> Frascarelli (1999, 2000) proposes that the reduced agreement in the case of subject focus is a result of the solution of the redundancy in checking relations. Assuming that the verb in Foc licenses the focus interpretation of the subject under a checking relation, she points out that the subject enters into a checking relation with the verb twice; first with the verb in Infl, and second with the verb in Foc. She suggests that the feature checking involving focus is preferred to the checking involving Case since Case has less interface effects (Case is uninterpretable while focus has both semantic and phonological effects). Therefore, the checking involving Case is cancelled, resulting in a reduced form of the agreement.

In KiYaka, the subject agreement shows up on the verb even if the subject is focused. That is, apparently, KiYaka lacks Anti-agreement effects. I suggest that in KiYaka if the subject is focused in postverbal focus constructions, the other OCC feature can be cancelled. I assume that the cancellation of the OCC feature checking is a last resort operation that deletes the OCC feature when nothing can check it. If this line of approach is correct, then Anti-agreement effects are in fact manifested as a lack of the checking of an OCC-feature on Infl in KiYaka. Then, we can plausibly derive the structure in (36).

Let us now discuss another possible account for the postverbal object focus. I suggest that there is an IP-internal FocP in KiYaka (Bowers 1998, Jayaseelan 2001, Ndayiragije 1999). The object moves to the Spec of FocP, and the verb moves to Infl through Foc:

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<sup>6</sup> According to Frascarelli (2000: 200), *Anti-agreement* is Ouhalla's (1992) term.

(41) [<sub>TopP</sub> children Top [<sub>IP</sub> V-v-Foc-Infl [<sub>FocP</sub> chickens <Foc>  
 [<sub>vP</sub> <chickens> <v> [<sub>vP</sub> ... ]]]]]

Assuming that VP and IP are spelled-out in this construction, V and the object ‘chickens’ are sent to the phonological component together.

Note that the subject may not occupy Spec-FocP. If it does, then the subject would move from the vP-internal subject position (A-position) to the Spec-FocP (A-bar position) to the Spec-IP (A-position), resulting in improper movement. Note also that the subject may not remain in the Spec of FocP under the Agreement Parameter: it has to move to Spec-IP since the verb bears subject agreement.

I will leave the detailed syntactic analysis of post-verbal focus constructions in KiYaka for future research. However, it is important to notice that the phonological phrasing of pre- and post-verbal focus constructions can be accounted for as a reflex of syntactic derivation without recourse to a special mechanism such as the restructuring of phonological phrasing induced by a presence of a focus.

#### **2.6.4 More on Preverbal Focus Constructions**

Kidima (1991) makes a very interesting observation in preverbal focus construction.

First, let us consider (42):

(42) a. bakhoko báná básúúmbidi baládididi  
 chicken that they-bought they-disappeared  
 ( )<sub>φ</sub> ( )<sub>φ</sub>

‘The chickens that they bought disappeared’

b. bakhókó báná básúúmbídí báládididi  
 it’s-chicken that they-bought they-disappeared  
 ( )<sub>φ</sub>

‘It’s the chickens that they bought that disappeared’

Kidima (1991: 181)

Here, the subject accompanies a relative clause. In (42a), there is no focus, and the entire subject phrase is phonologically phrased alone. In (42b), the subject is focused. Then the subject and the verb are phonologically phrased together. Putting aside a detailed syntactic analysis of the relative clause, the phonological phrasing in (42a) and (42b) are predicted by the theory developed so far. In (42a) where there is no focus, the subject is not phrased with the verb since it is in the Spec-IP or perhaps it is topicalized, and it is not mapped to the phonological component with the verb in Infl. In (42b), the focused subject is in the Spec of FocP, and the verb is in Foc. They are mapped to the phonological component together.

However, if the relative clause has an overt subject or object, the phonological phrasing shows an unexpected behavior:







- (48) i. Spell-Out within the relative clause: ‘liver’ is mapped to  $\Phi$ .  
 ii. V moves to Foc  
 iii. ‘children that bought (liver)’ moves to Spec-FocP  
      $[_{\text{FocP}}$  children that bought (liver) disappear-Infl-Foc  $[_{\text{IP}} \dots$   
 iv. Spell-Out (Root): ‘children that bought (liver)’ in Spec FocP and  
     V in Foc are mapped to  $\Phi$ .

Since ‘liver’ has already been mapped to  $\Phi$  at the point of (iv), it is not clear why it can be phrased together with the verb in Foc. Descriptively and representationally, the following condition holds:<sup>7</sup>

- (49) A focused constituent may not be immediately followed by a phonological phrase boundary.

(49) accounts for the two things. First it accounts for the fact that the object of the relative clause ‘liver’ is phonologically phrased with the verb. Second it accounts for the fact that the phonological phrase boundary within the entire focused constituent is maintained. However, it is a

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<sup>7</sup> This condition is proposed by Dobashi (2002) to account for Sandawe data. It is not universal since, for example, in Chichewa, a focused constituent must be immediately followed by a phonological phrase boundary (Kanerva 1990). In Japanese, a focused constituent is phonologically phrased with all the phrases that follows it. Nagahara (1994) proposes the following constraint to account for it within an Optimality Theoretic framework (adapted from Nagahara (1994: 30)  
 (i) FOCUS-TO-END: No intervening p-phrase boundary between any focus constituent and the end of the sentence.

See Truckenbrodt (1995) for discussion.



descriptive observation on a representation and does not offer any explanation.

One might wonder if the (b)-examples in (43)-(46) would be counter-examples to the derivational approach that I have suggested, in favor of the representational constraint such as (49). However, I will show that a minor modification of the mapping algorithm not only accounts for those data within a derivational approach, but also gives a structural account for why (49) holds.

Suppose that as a result of the mapping to  $\Phi$ , a left phonological boundary is created (see Seidl 2001, cf. Halle and Idsardi 1995).<sup>8</sup>

(50) A left phonological boundary is created for a unit of Spell-Out.

And the right boundary is created before the preexistent left boundary, in accordance with the Strict Layer Hypothesis:<sup>9</sup>

(51) [<sub>CP</sub> C [<sub>IP</sub> Subj Infl [<sub>VP</sub> XP *v* [<sub>VP</sub> V YP]]]]

(52) a. Spell-Out (Sister of *v*): (V YP  
 b. Spell-Out (Sister of C): (Infl XP *v* (V YP  
 creation of the right boundary → (Infl XP *v* )(V YP

---

<sup>8</sup> (50) is consistent with my analysis presented in the previous chapters. I leave the systematic investigation under (50) for the future research. See Seidl 2001 for some extensive discussion.

<sup>9</sup> Alternatively, it would be possible to assume that just a boundary is created on the left of a unit of Spell-Out as a result of the mapping to  $\Phi$ ,

- c. Spell-Out (Root): (C Subj (Infl XP  $v$ ) (V YP  
 creation of the right boundary  $\rightarrow$  (C Subj) (Infl XP  $v$ )(V YP

Finally, the right boundary of the entire phonological phrasing is created:

(53) (C Subj) <sub>$\phi$</sub>  (Infl XP  $v$ ) <sub>$\phi$</sub>  (V YP) <sub>$\phi$</sub>

Under this approach, the phonological phrasing is a reflex of syntactic derivation, and the essence of the derivational approach to phonological phrasing is maintained.

Now, let us reconsider (46b) within the proposed system.

- (54) a. Spell-Out within the relative clause: ‘liver’ is mapped to  $\Phi$ .  
 b. Creation of a left boundary: (liver  
 c. V moves to Foc  
 d. ‘children that bought (liver’ moves to Spec-FocP  
     [<sub>FocP</sub> children that bought (liver disappear-Foc [<sub>IP</sub> ...  
 e. Spell-Out (Root): ‘children that bought (liver’ in Spec FocP and  
     V in Foc are mapped to  $\Phi$ .  
 f. Creation of a left boundary:  
     (children that bought (liver disappeared  
 g. Creation of right boundaries  
     (children that bought) (liver disappeared)

---

without creating a right boundary. This alternative approach would simplify the computation within  $\Phi$ .

In (54a), ‘liver’ is mapped to  $\Phi$ , and the left boundary is created as in (54b). In (54e), ‘children that bought (liver’ in the Spec of FocP and the verb ‘disappeared’ are mapped to  $\Phi$ . Under the assumption that the left boundary is created for a unit of Spell-Out, the left boundary is created before ‘children’ as in (54f). Note that there is no reason to create a left boundary before the verb ‘disappeared’ since it is part of the unit of this Spell-Out, and it is not the leftmost element in this unit. The right boundaries are created in accordance with the Strict Layer Hypothesis, as in (54g). Then, the object within the relative clause ‘liver’ and the matrix verb ‘disappeared’ are phonologically phrased together.

Note that unlike the descriptive condition in (49), the derivational approach presented so far gives an account for why the verb is phrased with the preceding element: the verb is spelled-out together with the focused constituent under the assumption that FocP is a strong phase, and therefore it does not have a phonological boundary on its left. It also accounts for why the phonological phrase boundary within the focused constituent is not deleted: Spell-Out applies within the relative clause and it creates a left boundary before the FocP is spelled-out.

In this section, I have shown that the apparent counter examples to the derivational approach not only can be accounted for in a derivational manner, but gives a structural account for the representational condition in (49).

### **3. Sandawe**

In this section, I discuss focus and its effect on phonological phrasing in Sandawe, a Khoisan language spoken in Tanzania (see Elderkin 1989

and Kagaya 1993 for discussion). Sandawe shows downstep, or a downward shift of pitch level, between words within a phonological phrase (see Pulleyblank 1986 for an analysis of downstep). The phonological phrasing is affected by the presence of focus.

In the analysis of the focus constructions in KiYaka (section 2), I made the following assumptions: (i) FocP above IP is a strong phase, (ii) a verb always moves to the head of FocP, (iii) a focused constituent moves to the Spec of FocP in the preverbal focus constructions (iv) a focused constituent does not move to the Spec of FocP in the postverbal focus constructions. I argued that the phonological phrasings in post- and preverbal focus constructions can be accounted for in a straightforward way under the assumption the initial element in the domain of Spell-Out escapes the mapping to the phonological component. In contrast, in this section I argue that the verb does not move to Foc in Sandawe. Moreover, I argue that FocP above IP may iterate, that there is an IP-internal FocP, and that the IP-internal FocP is not a strong phase, unlike the IP-external FocP.

In section 3.1, I briefly show some basic syntactic properties of Sandawe. In section 3.2, I introduce the data on phonological phrasing and give a descriptive account for the effect of focus in terms of a constraint (49), which prohibits a phonological phrase boundary that immediately follows a focused constituent. In section 3.3, I attempt to give a syntactic analysis of transitive constructions, which show an interesting correlation between focus and word order, with special reference to phonological phrasing.

### 3.1 Basic Syntactic Properties of Sandawe

First, Sandawe shows a free word order although SOV order is the most frequently observed one (Dalgish 1979, Eaton 2002, Elderkin 1989, Kagaya 1990).<sup>10</sup> Second, it allows *pro*-drop. Thus, the subject can be omitted. Third, there are two kinds of suffixes that are related to focus. One is called a nominative suffix, which may be attached to the subject. If the subject bears this suffix, it is interpreted as focused. The other is called a pgn-suffix, which agrees with the subject in person, gender and number. It may be attached to non-subjects (e.g., objects, verbs, etc.). When a non-subject bears this suffix, then it is interpreted as focused. See Dalgish (1979), Dempwolff (1916), Eaton (2002), Elderkin (1989, 1991) and Kagaya (1990, 1993) for the descriptions and analyses of Sandawe syntax.

### 3.2 Focus and Phonological Phrasing

A phonological phenomenon that is sensitive to the phonological phrasing in Sandawe is downstep, which is observed between words. Consider (55), where there is no focus:

- (55) <sup>1</sup>Sándá    <sup>1</sup>sómbá    <sup>2</sup>thíímé-sù  
           sanda     fish    cook-3Fem.Sg.Fut  
           ‘Sanda will cook the fish’                    Elderkin (1989: (3.64))

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<sup>10</sup> Eaton 2002 observes that S-Adv-O-V is the basic word order when Adverb is involved.











- (64) <sup>2</sup>swe <sup>1</sup>hí-á? <sup>1</sup>khìdzí-`-à? <sup>2</sup>haagàsúkée j?  
 now hi-3pl village-SPEC-3pl bring-up j?  
 ‘... and when they brought up villages, the idea of vilages, ...’  
 Elderkin (1989: 155)

Here *hí* and *khìdzi* bear a focus marker, and both have the highest pitch level, as pointed out by Elderkin (1989: 156). That is, (62) holds unless (63) forces the violation of (62).

Now, let us consider the examples so far seen in the light of (62) and (63). The phrasing of the SOV sentence without a focus is as follows:

- (65) (S)<sub>φ</sub> (OV)<sub>φ</sub> (see (57))

If the subject is focused, then the phonological phrasing in (65) is “restructured” as follows, under (62) and (63):

- (66) (S O V)<sub>φ</sub> (see (58))

Here, the phonological boundary between S and V in (65) is deleted in accordance with (62).

If the object is focused, the resultant phrasing is the same as the one that does not involve a focus in (65):

- (67) (S)<sub>φ</sub> (O V)<sub>φ</sub> (see (60))

Here, the left edge of the object coincides with the left edge of the phonological phrase under (63), and the focused constituent is not immediately followed by a phonological phrase boundary (62). Therefore, the phrasing in (67) happens to be the same as (65).

Consider the examples where there is a focused sentence-initial adverb:

(68) (ADV S)<sub>φ</sub> (O V)<sub>φ</sub> (see (59))

Here, the adverb is not followed by a phonological phrase boundary under (62). So the adverb and the subject are phrased together. Note that (62) does not affect the phrasing after the subject in (68). Therefore, the phonological phrase boundary between the subject and the object does not delete.

Let us consider the case where the verb is focused:

(69) (S)<sub>φ</sub> (O)<sub>φ</sub> (V)<sub>φ</sub> (see (61))

Here, the left edge of the focused verb corresponds to the left edge of a phonological phrase under (63). Note that since the verb is in the sentence-final position, it is followed by a phonological phrase boundary in accordance with the Strict Layer Hypothesis (in violation of (62)).

So far, I have shown that if there is a focused constituent, there may not be a phonological boundary immediately after it. In the next section, I will give a syntactic analysis of the focus constructions in Sandawe, which will be consistent with the phonological phrasings we have seen in

this section. Note that I have phonological phrasing data for a limited set of the sentences that I will analyze in the next section.

### 3.3 An Analysis of Sandawe Focus Constructions

Kagaya (1990) shows that the distribution of the focus markers restricts the word order in Sandawe. He shows the following data, the meaning of which is “Mother planted maize.”<sup>13</sup> Here, *-aa* is a focus marker attached to the subject, and *-sa* is a focus marker attached to non-subjects, which agrees with the subject in person, gender, and number:<sup>14, 15</sup>

(70) SOV	a.	iyoo-aa	/nining’	//aa
		mother-Foc	maize	plant
	b.	iyoo-aa	/nining’-sa	//aa
	c.	iyoo	/nining’-sa	//aa
	d.	iyoo	/nining’	//aa-sa
	e.	* iyoo-aa	/nining’-sa	//aa-sa
	f.	* iyoo-aa	/nining’	//aa-sa
	g.	* iyoo	/nining’-sa	//aa-sa

<sup>13</sup> Kagaya (1990) does not show the ungrammatical sentences. He describes, for example, that (70a-d) are the only grammatical sentences in SOV word order of the realis affirmative construction, and that no other sentence is grammatical in this construction, indicating that (70e-g) are ungrammatical. As we will see below, (70e-g) are ruled out by his generalizations.

<sup>14</sup> I call these markers focus markers. Cf. Kagaya 1990.

<sup>15</sup> In the original text, (72c) is given as (i) (Kagaya’s (1e))

(i) /nining’-sa iyoo //aa-sa

However, it is a typographical error and (72c) is the correct example.

(Ryohei Kagaya, personal communication)

- (71) SVO
- |    |           |         |             |
|----|-----------|---------|-------------|
| a. | iyoo-aa   | //aa    | /nining'    |
| b. | iyoo-aa   | //aa    | /nining'-sa |
| c. | iyoo      | //aa-sa | /nining'    |
| d. | iyoo      | //aa-sa | /nining'-sa |
| e. | * iyoo-aa | //aa-sa | /nining'    |
| f. | * iyoo-aa | //aa-sa | /nining'-sa |
| g. | * iyoo    | //aa    | /nining'-sa |
- (72) OSV
- |    |               |         |         |
|----|---------------|---------|---------|
| a. | /nining'      | iyoo-aa | //aa    |
| b. | /nining'-sa   | iyoo-aa | //aa    |
| c. | /nining'-sa   | iyoo    | //aa    |
| d. | /nining'      | iyoo    | //aa-sa |
| e. | * /nining'-sa | iyoo-aa | //aa-sa |
| f. | * /nining'    | iyoo-aa | //aa-sa |
| g. | * /nining'-sa | iyoo    | //aa-sa |
- (73) OVS
- |    |               |         |         |
|----|---------------|---------|---------|
| a. | /nining'-sa   | //aa    | iyoo-aa |
| b. | /nining'      | //aa-sa | iyoo-aa |
| c. | /nining'-sa   | //aa    | iyoo    |
| d. | /nining'      | //aa-sa | iyoo    |
| e. | * /nining'-sa | //aa-sa | iyoo-aa |
| f. | * /nining'    | //aa    | iyoo-aa |
| g. | * /nining'-sa | //aa-sa | iyoo    |
- (74) VSO
- |    |         |         |             |
|----|---------|---------|-------------|
| a. | //aa-sa | iyoo-aa | /nining'    |
| b. | //aa-sa | iyoo-aa | /nining'-sa |
| c. | //aa-sa | iyoo    | /nining'    |
| d. | //aa-sa | iyoo    | /nining'-sa |
| e. | * //aa  | iyoo-aa | /nining'    |

- |          |    |         |             |             |
|----------|----|---------|-------------|-------------|
|          | f. | * //aa  | iyoo-aa     | /nining'-sa |
|          | g. | * //aa  | iyoo        | /nining'-sa |
| (75) VOS | a. | //aa-sa | /nining'    | iyoo-aa     |
|          | b. | //aa-sa | /nining'-sa | iyoo-aa     |
|          | c. | //aa-sa | /nining'    | iyoo        |
|          | d. | //aa-sa | /nining'-sa | iyoo        |
|          | e. | * //aa  | /nining'    | iyoo-aa     |
|          | f. | * //aa  | /nining'-sa | iyoo-aa     |
|          | g. | * //aa  | /nining'-sa | iyoo        |

Kagaya (1990:(1) and (8))

Note that in these constructions, at least one focus marker has to show up. A sentence without any of these focus markers is ungrammatical.

Kagaya makes two generalizations.<sup>16</sup> One is based on the examples where the focus marker is attached to the verb, and the other is based on the examples where the focus marker is not attached to the verb. I will give an analysis of the generalizations in the next two sections.

### 3.3.1 Verb is Focused

In this section, I consider the examples where the verb bears the focus marker. The relevant examples are reproduced schematically here. Grammatical sentences are shown in (76) - (81), and ungrammatical sentences are shown in (82) - (87):

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<sup>16</sup> His generalizations are independently confirmed by Eaton's (2002) research.

*Grammatical:*

(76) SOV		S	O	V-sa			(70d)
(77) SVO	a.		S	V-sa	O		(71c)
	b.		S	V-sa	O-sa		(71d)
(78) OSV		O	S	V-sa			(72d)
(79) OVS	a.		O	V-sa	S-aa		(73b)
	d.		O	V-sa	S		(73d)
(80) VSO	a.			V-sa	S-aa	O	(74a)
	b.			V-sa	S-aa	O-sa	(74b)
	c.			V-sa	S	O	(74c)
	d.			V-sa	S	O-sa	(74d)
(81) VOS	a.			V-sa	O	S-aa	(75a)
	b.			V-sa	O-sa	S-aa	(75b)
	c.			V-sa	O	S	(75c)
	d.			V-sa	O-sa	S	(75d)

*Ungrammatical:*

(82) SOV	a.	*	S-aa	O-sa	V-sa		(70e)
	b.	*	S-aa	O	V-sa		(70f)
	c.	*	S	O-sa	V-sa		(70g)
(83) SVO	a.	*		S-aa	V-sa	O	(71e)
	b.	*		S-aa	V-sa	O-sa	(71f)
(84) OSV	a.	*	O-sa	S-aa	V-sa		(72e)
	b.	*	O	S-aa	V-sa		(72f)
	c.	*	O-sa	S	V-sa		(72g)
(85) OVS	a.	*		O-sa	V-sa	S-aa	(73e)
	b.	*		O-sa	V-sa	S	(73g)





Here the object moves to the Spec of  $vP$ , and the verb moves to  $v$ . When IP is spelled-out, the object and the verb are phonologically phrased together, and the subject, which escapes the mapping to the phonological component, is phrased alone.

Now let us consider the examples where V bears a focus marker. First, let us adopt the following basic phrase structure for the focus constructions in Sandawe, which I also adopted for KiYaka in section 2:

(88)  $[_{\text{TopP}} \text{Top} [_{\text{FocP}} \text{Foc} [_{\text{IP}} \text{Subj Infl} [_{\text{vP}} v [_{\text{VP}} \text{V Obj} ]]]]]]$

I also assume the following:

- (89) a. The focused constituent moves to the Spec of FocP.  
 b. The focus marker is the realization of the head of FocP.  
 c. The verb does not move to the head of FocP.

Under (89a-b), if the object is focused, then it moves to the Spec of FocP, and the head of FocP is realized as a focus marker which agrees with the subject:

(90)  $\begin{array}{c} \text{FocP} \\ \diagdown \quad \diagup \\ \text{Obj} \quad \quad \text{Foc} \\ \quad \quad \quad | \\ \quad \quad \quad \text{-sa} \end{array}$

Likewise, if the subject is focused, then it moves to the Spec of FocP, and the head of FocP is realized as a focus marker *-aa*.<sup>18</sup>

Note that the assumption in (89c) is different from the assumption made for KiYaka in section 2. In Sandawe, the verb is not always adjacent to the focused constituent (e.g., (70a)), indicating that the verb is not in a position local to the focused constituent. And also, the verb does not necessarily form a morphological unit with the focus marker which is the realization of Foc under (89b), indicating that the verb does not move to Foc. Therefore, I assume that the verb stays in *v*.

As we have already seen, it is possible to have two or more focused elements in a sentence in Sandawe. I assume that the FocP may iterate in Sandawe:<sup>19</sup>

(91) [<sub>TopP</sub> Top [<sub>FocP</sub> Foc [<sub>FocP</sub> Foc [<sub>IP</sub> ... ]]]]

Under these assumptions, let us consider the derivation of the focused verb. If the verb bears the focus marker as a result of head-movement to Foc, then it would be expected that the verb would bear two focus

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<sup>18</sup> I assume that the agreement between the subject and the focus marker is established under Agree relation between Foc and the subject. Thus, the [uPhi] of Foc is checked by the subject, and the OCC feature of Foc is checked by a non-subject. If the subject is focused, then Anti-agreement effects show up so that the Foc is realized as a non-agreeing form. Cf. Frascarelli 1999.

<sup>19</sup> Note that Rizzi (1997: 297) argues that the FocP may not iterate since it would be inconsistent with the assumption that the complement of FocP is a presupposition. Since Sandawe allows multiple foci, I assume that the iteration of FocP is indeed possible, and leave open the precise semantic analysis of Sandawe focus constructions.

markers since the head-movement of the verb would pied-pipe all the heads to which it adjoins in the course of derivation, under the assumption that head-movement is local and that the excorporation is prohibited:

(92)  $[_{\text{FocP}} \text{ V-Foc-Foc } [_{\text{FocP}} \langle \text{V-Foc} \rangle [_{\text{IP}} \dots \langle \text{V} \rangle \dots ]]]$

However, as in (77b), (79a), (80a.b.d) and (81a.b.d), the focused subject and object that follow the focused verb bear the focus marker, and the verb bears only one focus marker. Therefore, I conclude that the verbal focus does not result from the head-movement of the verb to Foc.

Given the fact that the verb bearing the focus marker must precede the other focused elements, I propose that the  $v\text{P}$  undergoes movement to Spec-FocP after all the other elements besides V have been moved out of the  $v\text{P}$ . That is, non-head material is removed from  $v\text{P}$ , and  $v\text{P}$  undergoes remnant movement (See Collins 2003a, Kayne 2003, Koopman and Szabolcsi 2000, Müller 1998). Consider the following hypothetical derivation where X and V are both focused:

(93) a.  $[_{\text{FocP}} \text{ Foc } [_{\text{IP}} \text{ Infl } [_{\text{vP}} \langle \text{X} \rangle \text{ V-}v \text{ } [_{\text{VP}} \dots ]]]]$   
 b.  $[_{\text{FocP}} \text{ X Foc } [_{\text{IP}} \text{ Infl } [_{\text{vP}} \langle \text{X} \rangle \text{ V-}v \text{ } [_{\text{VP}} \dots ]]]]$   
 c.  $[_{\text{FocP}} \text{ Foc } [_{\text{FocP}} \text{ X Foc } [_{\text{IP}} \text{ Infl } [_{\text{vP}} \langle \text{X} \rangle \text{ V-}v \text{ } [_{\text{VP}} \dots ]]]]$   
 d.  $[_{\text{FocP}} [_{\text{vP}} \langle \text{X} \rangle \text{ V-}v \text{ } [_{\text{VP}} \dots ]]] \text{ Foc } [_{\text{FocP}} \text{ X Foc } [_{\text{IP}} \text{ Infl } \langle \text{vP} \rangle ]]]]$

First, Foc is merged to IP, as in (93a). Second, X moves to the Spec of FocP, as in (93b). Third, Foc is merged to the lower FocP, as in (93c). At this point,  $v\text{P}$  contains only V. Fourth, the  $v\text{P}$  undergoes remnant

movement to the Spec of the higher FocP. Given the cyclicity, this derivation accounts for the fact that the focused verb always precedes all the other focused element(s) (see (86)). If  $vP$  moved first, then the focused  $X$  would have to move out of the moved constituent, i.e.,  $vP$  in the Spec of the lower FocP, in order to reach the Spec of the higher FocP. Such movement resembles a violation of CED, and is generally ruled out for independent reasons (Chomsky and Lasnik 1993: 79ff., Collins 2003a, Müller 1998, Takahashi 1994). Therefore, the remnant movement approach account for the fact that the focused verb always precedes the other focused constituent.

Now, let us consider the word order variation. Suppose that the FocP may iterate, and that the TopP may be generated above IP and FocP, as in (94):<sup>20</sup>

(94)  $[_{TopP}^* \text{ Top } [_{FocP} \text{ Foc } [_{TopP}^* \text{ Top } [_{FocP} \text{ Foc } [_{TopP}^* \text{ Top } [_{IP} \dots$

Under these assumptions, I suggest the following structures for the grammatical sentences with a focused verb.

- (95) a.  $[_{TopP} \text{ S Top } [_{TopP} \text{ O Top } [_{FocP} [_{vP} \text{ V-}v] \text{ Foc } [_{IP} \dots$  (76)  
 b.  $[_{TopP} \text{ S Top } [_{FocP} [_{vP} \text{ V-}v] \text{ Foc } [_{TopP} \text{ O Top } [_{IP} \dots$  (77a)  
 c.  $[_{TopP} \text{ S Top } [_{FocP} [_{vP} \text{ V-}v] \text{ Foc } [_{FocP} \text{ O Foc } [_{IP} \dots$  (77b)  
 d.  $[_{TopP} \text{ O Top } [_{TopP} \text{ S Top } [_{FocP} [_{vP} \text{ V-}v] \text{ Foc } [_{IP} \dots$  (78)

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<sup>20</sup> (94) is different from Rizzi's (1997) phrase structure in that FocP iterates (see the previous footnote), but similar to it in that TopP is generated below and above FocP (Rizzi 1997: 297).

- e.  $[_{TopP} O Top [_{FocP} [_{vP} V-v] Foc] [_{FocP} S Foc] [_{IP} \dots]$  (79a)
- f.  $[_{TopP} O Top [_{FocP} [_{vP} V-v] Foc] [_{TopP} S Top] [_{IP} \dots]$  (79b)
- g.  $[_{FocP} [_{vP} V-v] Foc] [_{FocP} S Foc] [_{TopP} O Top] [_{IP} \dots]$  (80a)
- h.  $[_{FocP} [_{vP} V-v] Foc] [_{FocP} S Foc] [_{FocP} O Foc] [_{IP} \dots]$  (80b)
- i.  $[_{FocP} [_{vP} V-v] Foc] [_{TopP} S Top] [_{TopP} O Top] [_{IP} \dots]$  (80c)
- j.  $[_{FocP} [_{vP} V-v] Foc] [_{TopP} S Top] [_{FocP} O Foc] [_{IP} \dots]$  (80d)
- k.  $[_{FocP} [_{vP} V-v] Foc] [_{TopP} O Top] [_{FocP} S Foc] [_{IP} \dots]$  (81a)
- l.  $[_{FocP} [_{vP} V-v] Foc] [_{FocP} O Foc] [_{FocP} S Foc] [_{IP} \dots]$  (81b)
- m.  $[_{FocP} [_{vP} V-v] Foc] [_{TopP} O Top] [_{TopP} S Top] [_{IP} \dots]$  (81c)
- n.  $[_{FocP} [_{vP} V-v] Foc] [_{FocP} O Foc] [_{TopP} S Top] [_{IP} \dots]$  (81d)

Of these, we have the datum on phonological phrasing for (95a), which is (61) repeated here:

- (61) <sup>2</sup>ʔútè <sup>1</sup>sándá <sup>1</sup>sóbá <sup>1</sup>thíímé-sà  
 yesterday Sanda fish cooked-3Fem.Sg  
 ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub> ( )<sub>φ</sub>  
 ‘Sanda cooked the fish yesterday’ Elderkin (1989: 96: (3.10))

Here, the subject, the object, and the verb are phrased separately. Given the structure shown in (95a), we can readily account for the phonological phrasing in (61) with the assumption made in (21) that a topic corresponds to an intonational phrase. Since the subject and the object occupy a Spec of TopP, they are phrased separately. As a result, the verb is phrased alone.

### 3.3.2 Verb is Not Focused

Let us consider the other generalization of Kagaya's, which is about the examples where the verb does not bear the focus marker. The relevant examples are reproduced schematically below. (96)-(99) are grammatical sentences, and (100)-(103) are ungrammatical sentences:

*Grammatical:*

(96) SOV	a.	S-aa	O	V		(70a)
	b.	S-aa	O-sa	V		(70b)
	c.	S	O-sa	V		(70c)
(97) SVO	a.		S-aa	V	O	(71a)
	b.		S-aa	V	O-sa	(71b)
(98) OSV	a.	O	S-aa	V		(72a)
	b.	O-sa	S-aa	V		(72b)
	c.	O-sa	S	V		(72c)
(99) OVS	a.		O-sa	V	S-aa	(73a)
	b.		O-sa	V	S	(73c)

*Ungrammatical:*

(100) SVO	*	S	V	O-sa		(71g)
(101) OVS	*	O	V	S-aa		(73f)
(102) VSO	a.	*	V	S-aa	O	(74e)
	b.	*	V	S-aa	O-sa	(74f)
	c.	*	V	S	O-sa	(74g)
(103) VOS	a.	*	V	O	S-aa	(75e)
	b.	*	V	O-sa	S-aa	(75f)
	c.	*	V	O-sa	S	(75g)

Kagaya gives the following generalization:<sup>21</sup>

- (104) Let X, Y be elements other than V. If X has a focus marker;
- (i) V which follows X may not have a focus marker,
  - (ii) V which precedes X must have a focus marker if Y with a focus marker is absent before V.

(100)-(103) violate (104ii), and they are ungrammatical.

Let us first consider the single focus constructions. Let us take (96a) for example, for which phonological phrasing datum is also available.

- (58) <sup>2</sup>?útè            <sup>1</sup>Sándá-á            <sup>2</sup>sómbá    <sup>3</sup>thíímé  
 yesterday    Sanda-Nom    fish            cooked  
 (            )<sub>φ</sub> (            )<sub>φ</sub>  
 ‘Yesterday Sanda cooked the fish’    Elderkin (1989: 96: (3.10))

Here, the focused subject, the object and the verb are all phrased together. Suppose that the focused subject moves to the Spec of FocP, and the object and the verb stay within vP:

- (105)            [<sub>FocP</sub> Subj Foc [<sub>IP</sub> <Subj> Infl [<sub>vP</sub> Obj V-v [<sub>VP</sub> ... ]]]]

<sup>21</sup> The if-clause in (104ii) is intended to account for (97b) and (99a). They are grammatical even though V, which precedes a focused element X, does not bear a focus marker because it follows a focused element Y.

Suppose that FocP is a strong phase (see (28)). Then IP is spelled-out, and the object and the verb would be phonologically phrased together, while the focused subject would be phrased alone, contrary to the attested facts.

Now, suppose that there is a FocP within IP, as proposed by Bowers (1998), Jayaseelan (2001) and Ndayiragije (1999):

(106)  $[_{CP} C [_{IP} Infl [_{FocP} Foc [_{vP} v [_{VP} \dots ]]]]]$

Suppose that the object and the verb move to Spec of  $vP$  and  $v$ , respectively, as I have been assuming, and that the focused subject moves the Spec of the IP-internal FocP:

(107)  $[_{CP} C [_{IP} Infl [_{FocP} Subj Foc [_{vP} Obj V-v [_{VP} \dots ]]]]]$

Suppose that  $vP$ , but not FocP, is a strong phase within IP (in transitive constructions):

(108)  $vP$  is a strong phase (IP-internal FocP is not a strong phase).

Then, when the sister of C is spelled-out, the subject, the object, and the verb are sent to the phonological component together, resulting in the phonological phrasing where all of the three belong to a single phonological phrase.

Now let us consider the phonological phrasing of (96c) where the object is focused:



- (60) <sup>2</sup>?útè      <sup>1</sup>sándá    <sup>1</sup>sómbá-sà    <sup>2</sup>thíímé  
 yesterday    Sanda    fish-3Fem.Sg    cooked  
 (            )<sub>φ</sub>(            )<sub>φ</sub>(            )<sub>φ</sub>  
 ‘Sanda cooked the fish yesterday’      Elderkin (1989: 96: (3.10))

Here, the subject is phrased alone, and the object and the verb are phrased together. Suppose that the object moves to the IP-external FocP. Given the fact that the subject precedes the focused object, I assume that the subject is topicalized:

- (109) [<sub>TopP</sub> Subj Top [<sub>FocP</sub> Obj Foc [<sub>IP</sub> Infl [<sub>vP</sub> <Obj> V-*v* [<sub>VP</sub> ... ]]]]]

If Spell-Out applies to the sister of Foc, then it would be predicted that the focused object and the verb are not phrased together.<sup>22</sup>

Suppose instead that the object moves into the Spec of the IP-internal FocP:

- (110) [<sub>CP</sub> C [<sub>IP</sub> Subj Infl [<sub>FocP</sub> Obj Foc [<sub>vP</sub> <Obj> V-*v* [<sub>VP</sub> ... ]]]]]

Then, whether the subject is topicalized or occupies the Spec of IP, it is predicted that the object and the verb are phonologically phrased together as a result of the Spell-Out of IP.

<sup>22</sup> I leave open how the derivations in (105) and (109) are blocked syntactically. It would be the case that there is a preference for the use of IP-internal FocP over IP-external FocP since the preverbal position seems to be a preferred focus position in Sandawe (Eaton 2002, Jayaseelan (2001)).

Let us now consider (96b), where the subject and the object are both focused. Unfortunately, no phonological evidence is available. However, as suggested by Dobashi (2002), the constraint (63), repeated below, is undominated in the hierarchy of the optimality theoretic constraints.<sup>23</sup> Suppose that such a constraint ranking is descriptively correct:

(63) The left edge of a focused constituent corresponds to the left edge of a phonological phrase.

If the FocP iterates within IP, and if the assumption that *v*P, but not FocP, is a strong phase within IP is correct, then the phrase X in the Spec of the higher FocP would be phrased together with the phrase Y in the Spec of the lower FocP within IP:

(111) [<sub>CP</sub> C [<sub>IP</sub> Infl [<sub>FocP</sub> X Foc [<sub>FocP</sub> Y Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ... ]]]]]]]

When IP is spelled-out, X and Y and V are sent to the phonological component together. Note that Infl serves as the initial element if the Spec of IP is absent. Then the resulting phonological phrasing does not conform to the observation (63), assuming that (63) has no exceptions and that (63) should be given a structural account. Therefore, I adopt the following stipulations:

(112) a. IP-internal FocP may not iterate.

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<sup>23</sup> See (64). Note that the equivalent constraint is ranked highest in Japanese, too (Nagahara 1994).

b. IP-external FocP may iterate.

Given that V stays in *v* and does not move to Infl in Sandawe, the focused constituent in the Spec of IP-internal FocP always corresponds to the leftmost element in a phonological phrase under (112a). Therefore, I assume the following structure for (96b):

(113) [<sub>FocP</sub> Subj Foc [<sub>IP</sub> Infl [<sub>FocP</sub> Obj Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ... ]]]]]

When IP is spelled-out, Obj and V are mapped to the phonological component together.

Notice that under these assumptions, we can account for the ungrammaticality of the sentences (100)-(103) where a verb that does not bear the focus marker precedes the focused subject or object:

(100) SVO	*	S	V	O-sa		(71g)
(101) OVS	*	O	V	S-aa		(73f)
(102) VSO	a.	*	V	S-aa	O	(74e)
	b.	*	V	S-aa	O-sa	(74f)
	c.	*	V	S	O-sa	(74g)
(103) VOS	a.	*	V	O	S-aa	(75e)
	b.	*	V	O-sa	S-aa	(75f)
	c.	*	V	O-sa	S	(75g)

The focused subject and object must precede the verb in *v* since both IP-internal and IP-external FocP's are located higher than *vP*.

However, the grammatical examples (97a,b) and (99a,b) would be problematic under this account:

(97) SVO	a.	S-aa	V	O	(71a)
	b.	S-aa	V	O-sa	(71b)
(99) OVS	a.	O-sa	V	S-aa	(73a)
	b.	O-sa	V	S	(73c)

The object must precede the verb in  $v$ , contrary to (97a), since I am assuming that the object always moves to the Spec of  $vP$ . Similarly, since the base position of the subject (Spec of  $vP$ ) is higher than  $v$ , the subject must precede the verb in  $v$ , contrary to (99b). And also, under the assumption that the non-focused verb is in  $v$ , the focused phrase may not follow the verb, contrary to (97b) and (99a).

However, unlike (100)-(103), there is a focused constituent preceding the verb in (97a, b) and (99a, b), suggesting that the IP-internal FocP, within which a subject or object occupies Spec-FocP and the verb is in  $v$ , moves to the sentence initial position. In light of these considerations, let us consider the derivation of (97b). I suggest that (97b) is derived from (98b), as illustrated in (114):

(98b) O-sa [S-aa V] → (97b) [S-aa V] O-sa

(114) a. [<sub>FocP</sub> Obj Foc [<sub>IP</sub> Infl [<sub>FocP</sub> Subj Foc [<sub>vP</sub> V- $v$  [<sub>vP</sub> ...]]]]]  
 b. [<sub>XP</sub> [<sub>FocP</sub> Subj Foc [<sub>vP</sub> V- $v$  [<sub>vP</sub> ...]]] X [<sub>FocP</sub> Obj Foc [<sub>IP</sub> Infl <FocP>]]]

First, (114a) is constructed. If no other movement applies to (114a), (98b) is obtained. Suppose that FocP moves to the sentence initial position, as in (114b). Then (97b) results. Similarly, (99a) is derived from (96b) by applying the IP-internal FocP movement:

(96b) S-aa [O-sa V] → (99a) [O-sa V] S-aa

(115) a. [<sub>FocP</sub> Subj Foc [<sub>IP</sub> Infl [<sub>FocP</sub> Obj Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ... ]]]]]  
 b. [<sub>XP</sub> [<sub>FocP</sub> Obj Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ... ]]]] X [<sub>FocP</sub> Subj Foc [<sub>IP</sub> Infl <FocP>]]]

(115a) = (113) is the structure of (96b). In (115b), the IP-internal FocP undergoes movement to the sentence initial position, resulting in (99a).

Let us next consider (97a) and (99b). I suggest that (97a) is derived from (98a), and (99b) from (96c).

(98a) O [S-aa V] → (97a) [S-aa V] O

(96c) S [O-sa V] → (99b) [O-sa V] S

Let us take (97a) for example:

(116) a. [<sub>TopP</sub> Obj Top [<sub>IP</sub> Infl [<sub>FocP</sub> Subj Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ... ]]]]]]  
 b. [<sub>XP</sub> [<sub>FocP</sub> Subj Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ... ]]]] X [<sub>TopP</sub> Obj Top [<sub>IP</sub> Infl <FocP>]]]

In (116a), I assume that the object is topicalized. The subject occupies the Spec of IP-internal FocP and the verb is in *v*. If FocP moves to the

sentence initial position, as in (116b), (97a) is obtained. Similarly, (99b) is derived from (96c):

- (117) a. [<sub>IP</sub> Subj Infl [<sub>FocP</sub> Obj Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ...]]]]  
 b. [<sub>XP</sub> [<sub>FocP</sub> Obj Foc [<sub>vP</sub> V-*v* [<sub>VP</sub> ...]]] X [<sub>IP</sub> Subj Infl <FocP> ]]

In (117), the object is in the Spec of IP-internal FocP and the verb is in *v*. I assume that the subject is in the Spec of IP here. If the FocP moves to the sentence initial position, (99b) is obtained.

Note that this kind of “heavy” movement should be restricted to prevent unwelcome overgeneration. I propose the following stipulations:

- (118) a. *vP* can be focalized if all the elements other than the verb have been moved out of it.  
 (see (93); cf. Koopman and Szabolcsi 2000: 31))  
 b. IP-internal FocP can be moved to the sentence initial position if it contains both the focused element in the Spec of FocP and the verb in *v*.

I assume that no other heavy movement may be allowed in Sandawe focus constructions. (118a) could be motivated semantically and morphologically. Semantically, if it bears a focus marker, the verb itself receives a focused or emphatic interpretation (Eaton 2002, Kagaya 1990: 2). Morphologically, if some sort of structure-preservation condition holds, the fact that the verb bears the same morphological marker as a subject or object (an “XP” element) indicates that not just V, i.e., a head,

but the entire  $vP$  moves to the Spec of FocP. (118b) could be motivated by the fact that the preverbal position is a preferred focus position in Sandawe, as discussed in Eaton (2002) (This preference is also found in Hungarian (Kiss 1987), Malayalam (Jayaseelan 2001), and so on). That is, the IP-internal FocP seems to correspond to a sort of interpretive unit. Therefore, it may be a target of movement. Note that, if so, the assumption that the  $vP$ , but not the IP-internal FocP, is a phase would be problematic. However, first, the phonological evidence suggests that  $vP$  should be a strong phase. Second, given that a phase is propositional (Chomsky 2001a, b), then it is not unreasonable to assume that  $vP$  is a phase even when FocP is postulated above  $vP$ . I will leave these conceptual issues open here.

Thus far, I have given a syntactic analysis of the grammatical sentences (96a,b,c) (97a,b), (98a,b) (99a,b), and an analysis of phonological phrasing based on the proposed syntactic analysis. I have also suggested that the ungrammatical sentences in (100) - (103) are ruled out because of the structural reasons: the non-focused verb is in  $v$ , and therefore cannot precede the focused element which occupies a higher position.

In what follows, I will give a syntactic analysis of (98c), which I have not discussed so far. I also discuss some other issues that arise due to the introduction of “heavy” movement (movement of  $vP$  and IP-internal FocP). And lastly, I give an analysis of the phonological phrasing in (59), which has not been discussed yet.

Let us consider (98c):

(98c) O-sa S V

Here, the focused object is not adjacent to the verb. Unfortunately, the phonological datum for (98c) is not available. However, note that at least syntactically, the subject and the object show parallel behavior in focus constructions in that they are interchangeable except that the forms of the focus marker are different. This is also explicit in Kagaya's generalizations which do not make a distinction between the subject and the object except for the form of the focus marker. Therefore, I propose that (98c) has a similar structure to (96a). (96a) and its structure (107) are repeated below:

(96a) S-aa O V

(107) [<sub>CP</sub> C [<sub>IP</sub> Infl [<sub>FocP</sub> Subj Foc [<sub>vP</sub> Obj V-*v* [<sub>VP</sub> ... ]]]]]

I proposed that the subject be in the Spec of the IP-internal FocP because the subject, the object, and the verb are phonologically phrased together in this sentence. To maintain the structural parallelism between (96a) and (98c), I assume the following syntactic structure for (98c):

(119) [<sub>CP</sub> C [<sub>IP</sub> Infl [<sub>FocP</sub> Obj Foc [<sub>vP</sub> <Obj> Subj V-*v* [<sub>VP</sub> ... ]]]]]

Here, the subject remains in the *vP*-internal subject position, i.e., the Spec of *vP*, and the object moves to the Spec of IP-internal FocP, and the verb is in *v*. Note that it is predicted that if Spell-Out applies to IP, all of the



object, the subject and the verb are phonologically phrased together. This prediction is also consistent with the one made under (62) and (63).

Now let us consider some issues concerning “heavy” movement and IP-internal FocP.

First, one might wonder if ungrammatical (100) and (101) could be derived from (98c) and (96) by  $vP$  movement.

(98c) O-sa S V  $\rightarrow$  (100) \* S V O-sa

(96a) S-aa O V  $\rightarrow$  (101) \* O V S-aa

In order to allow these derivations,  $vP$ , which contains the verb and the subject/object, should undergo movement. However, under the assumption (118) that  $vP$  may undergo movement only when all the elements but the verb have moved out of the  $vP$ ,  $vP$  containing the subject or the object may not undergo movement. Therefore, (100) and (101) cannot be derived from (98c) and (96a), respectively.

Second, for the multiple focus constructions that involve the focused verb (i.e., (77b), (79a), (80a, b, d), and (81a, b, d)), I proposed in (95) that all the focused elements occupy the IP-external FocP. However, it would be possible that in these examples the rightmost focused element occupies the IP-internal FocP. For instance, (77b), repeated below, could have the structure in (120). (95c), repeated below, is an analysis of (77b) proposed before I introduced the IP-internal FocP:

(77b) S V-sa O-sa

(120) [<sub>TopP</sub> S Top [<sub>FocP</sub> [<sub>vP</sub> <O> V- $v$ ] Foc [<sub>IP</sub> Infl [<sub>FocP</sub> O Foc < $vP$ >]]]]

cf. (95c)  $[_{\text{TopP}} \text{S Top } [_{\text{FocP}} [_{\text{vP}} \langle \text{O} \rangle \text{V-v}] \text{Foc } [_{\text{FocP}} \text{O Foc } [_{\text{IP}} \dots$

In (120), the object moves to the Spec of IP-internal FocP, and then the vP moves to the Spec of IP-external FocP. Since there is no evidence against this approach, I take this option to be equally possible.

Third, given the IP-internal FocP movement analysis, it might be possible to derive the ungrammatical examples in (82a, b, c), (83a, b), (84a, b, c) and (85a, b), where the focused subject and/or object precedes the focused verb. For instance, (84c) could be derived from (77b) = (121a), as in (121b), by moving the IP-internal FocP:

(77b)  $\text{S V-sa } [_{\text{O-sa}}] \rightarrow (84c) * [_{\text{O-sa}}] \text{S V-sa}$

(121) a.  $[_{\text{TopP}} \text{S Top } [_{\text{FocP}} [_{\text{vP}} \langle \text{O} \rangle \text{V-v}] \text{Foc } [_{\text{IP}} \text{Infl } [_{\text{FocP}} \text{O Foc } \langle \text{vP} \rangle$

b.  $[_{\text{XP}} [_{\text{FocP}} \text{O Foc } \langle \text{vP} \rangle ] \text{X } [_{\text{TopP}} \text{S Top } [_{\text{FocP}} [_{\text{vP}} \langle \text{O} \rangle \text{V-v}] \text{Foc } [_{\text{IP}} \text{Infl } \langle \text{FocP} \rangle$

However, under (118b), FocP may not move if the verb or vP moved out of it. Therefore, it is impossible to derive these ungrammatical examples.

Fourth, under the assumption that vP moves to the Spec of FocP if the verb is focused, it might be possible to move vP to the Spec of IP-internal FocP:

(122)  $[_{\text{FocP}} \text{Foc } [_{\text{vP}} \text{V-v} ] ] \rightarrow$   
 $[_{\text{FocP}} [_{\text{vP}} \text{V-v} ] \text{Foc } \langle \text{vP} \rangle ]$

If this were possible, then we might be able to derive the ungrammatical sentences in (82)-(85), where a focused subject/object precedes the focused verb, by moving the focused subject/object to the Spec of IP-external FocP. However, first, the movement in (122) is too short in that it moves from the complement to the spec of the same head. I assume that such movement should not be allowed (see Collins 2003a). Second, since  $vP$  may move if all the elements other than the verb move out of the  $vP$  under (118),  $vP$  movement into the Spec of IP-internal FocP requires a counter-cyclic derivation if one of the arguments within  $vP$  moves to the Spec of IP-external FocP. Therefore, under the assumption that IP-internal FocP may not iterate (see (112)),  $vP$  has to move to the Spec of IP-external FocP.

Fifth, it would be possible to derive (82b) and (84b), repeated here, through the derivation shown in (123) (I ignore the object here):

(82b) \* S-aa O V-sa

(84b) \* O S-aa V-sa

(123) a. [<sub>IP</sub> S Infl [<sub>vP</sub> <S> V- $v$  [<sub>vP</sub> ...

b. [<sub>FocP</sub> [<sub>vP</sub> <S> V- $v$  ...] Foc [<sub>IP</sub> S Infl < $vP$ >

c. [<sub>FocP</sub> S Foc [<sub>FocP</sub> [<sub>vP</sub> <S> V- $v$  ...] Foc [<sub>IP</sub> S Infl < $vP$ >

First, S moves to the Spec of Infl, as in (123a). Second, the remnant  $vP$  undergoes movement to the Spec of FocP. Third, S moves further to the Spec of the higher FocP. (O can be in the Spec of TopP which is generated below or above the higher FocP.) Each movement does not have any problem. Note that the movements in (123) take the form of



Here, the sentence-initial adverb is focused. The focused adverb and the subject are phrased together on the one hand, and the object and the verb are phrased together on the other hand.

Assuming that non-focused subject occupies its canonical position, i.e., the Spec of IP, the focused adverb has to occupy the Spec of IP-external FocP position in (59), otherwise the subject would precede the adverb:

(125) [<sub>FocP</sub> yesterday Foc [<sub>IP</sub> Sanda Infl [<sub>VP</sub> fish cooked-v  
[<sub>VP</sub> <V> <Obj> ]]]]

When Spell-Out applies to the sister of Foc, the object ‘fish’ and the verb ‘cooked’ are mapped to the phonological component  $\Phi$ . Note that the subject ‘Sanda’ is the initial element in the domain of this Spell-Out. Therefore, it is phonologically phrased with the elements within the higher domain of Spell-Out. Assuming that FocP is spelled-out as a root of the sentence, the focused adverb ‘yesterday’ and the subject ‘Sanda’ are mapped to  $\Phi$  together and form a single phonological phrase (see section 2.6.2 for discussion about the Spell-Out of the roots). Note that (59) provides another piece of evidence for the proposal that the initial element in the domain of Spell-Out escapes the mapping to  $\Phi$ .

#### 4. Summary

In this chapter, I have provided an account for the phonological phrasing of focus constructions in KiYaka and Sandawe within the proposed derivational approach to phonological phrasing. I proposed that FocP above IP is a strong phase head. I showed that the analysis of the focus

constructions provide support for the assumption that the initial element in the domain of the Spell-Out escapes the mapping to the phonological component. Moreover, I showed that the proposed analysis provides a structural account for the representational constraint that prohibits a phonological phrase boundary to appear after the focus.

## CHAPTER FIVE

### ELIMINATING PHONOLOGICAL PHRASES

#### **1. Introduction**

The theory of phonological phrasing explored so far presupposes the existence of phonological phrases, which are representational. In a strictly derivational approach to phonological phrasing, there should not be such representational notion. That is, if the phonological computation is performed as the syntactic derivation goes on, then it should be the case that the phonological string that underwent mapping to the phonological component undergoes phonological rules, and it can no longer be accessible later in the derivation. In this chapter, I speculate about such a possibility.

#### **2. Strictly Derivational Theory of Phonological Phrasing**

In section 3.3 of Chapter 2, I proposed the following condition on the restructuring of phonological phrasing:

- (1) Restructuring is always to the left.

And in section 3.6, I proposed that (1) should be parameterized as follows:

- (2) Restructuring is always to the left or right.

Note that these conditions presuppose the existence of phonological phrases in the phonological component  $\Phi$ . That is, as a result of the mapping of a phonological string to  $\Phi$ , a p-phrase is created, and such a p-phrase undergoes restructuring when it does not satisfy the prosodic branching condition.

However, if the mapping to  $\Phi$  occurs as the syntactic derivation goes on, and if phonological rules apply as the mapping takes place, it would be unnecessary to create a p-phrase in  $\Phi$ . That is, the phonological rules apply when a phonological string is mapped to  $\Phi$ , and such a phonological string becomes inaccessible when another phonological string is mapped to  $\Phi$  later in the derivation. If so, the p-phrase is unnecessary. That is, the apparent p-phrase phenomena are reduced to the derivational properties of syntax and the cyclic mapping to  $\Phi$ .

Suppose so. Then, as I briefly discussed in section 3.3 of Chapter 2, the condition (1) can be recast as follows (here, I am still using the notion of p-phrase):

- (3) The “real” p-phrase may not be modified.

By “real” p-phrase, I meant a p-phrase that satisfies a legibility condition in  $\Phi$  (i.e. the prosodic branching condition if it is relevant in the language in question). Under (3), the effect of leftward restructuring (1) is a reflex of syntactic derivation. That is, a p-phrase that is defined earlier cannot be modified any more, disallowing the rightward restructuring. Assuming a version of Kayne’s (1994) LCA suggested in Chapter 1, the p-phrase that was created by the previous Spell-Out always follows the p-phrase



that is created by the current Spell-Out. Then, (3) indicates that a p-phrase cannot restructure into the p-phrase on its right since the latter p-phrase was created earlier and cannot be modified any more.

Let us amend (3) and the prosodic branching condition so that they do not refer to a p-phrase:

(4) Modified Prosodic Branching Condition:

A phonological string that contains only one phonological word is illegitimate in  $\Phi$ .

(5) A legitimate phonological string that was mapped to  $\Phi$  by the previous Spell-Out cannot be further modified.

Note that (4) is not an absolute condition in that it can be violated. Note also that it is not universal, since a p-phrase containing only one phonological word is legitimate in French and Ewe, as we have seen in Chapter 2.

Under these conditions, let us reconsider the Italian data. Let us first consider the case where no restructuring applies (I continue to use the term “restructuring” “p-phrase” and so on for descriptive purposes):

- (6)      Venderá      questo leopardo      in dicembre  
           sell.Fut.3sg.    this    leopard      in December  
           (                    ) $\Phi$  (                    ) $\Phi$  (                    ) $\Phi$

‘He will sell this leopard in December’

Nespor and Vogel (1986: 173)

Here, the verb and the branching object are not phrased together, as indicated by the lack of the lengthening of *q-* in *questo*.

The derivation proceeds as follows:

(7) [<sub>VP</sub> see-*v* [<sub>VP</sub> <see> this leopard ]]

Here, the object stays in situ, the verb ‘see’ moves to adjoin *v*, and the sister of *v* is Spelled-Out.

(8) Spell-Out(Sister of *v*):

- a. Linear Order: <see> this leopard
- b. Mapping to  $\Phi$ : this leopard

Here the phonological string ‘this leopard’ is mapped to  $\Phi$  as in (8b). In  $\Phi$ , we have the following phonological string:

(9) questo leopardo ‘this leopard’

(9) is legitimate under (4). Therefore, it undergoes some phonological rule if applicable at this point.

Suppose that the syntactic derivation reached the following stage:

(10) [<sub>CP</sub> C [<sub>IP</sub> pro see-*v*-Infl [<sub>VP</sub> <see-*v*> [<sub>VP</sub> <see> this leopard ]]]]

The sister of C is spelled-out:

(11) Spell-Out(Sister of  $v$ ):

- a. Linear Order: pro see- $v$ -Infl <see- $v$ > <see>
- b. Mapping to  $\Phi$ : see

Linearization defines Linear Order as shown in (11a), and ‘see’ is mapped to  $\Phi$  as in (11b). Then, we have the following phonological string in  $\Phi$ .

(12) venderá questo leopardo ‘see this leopard’

Under (5), the phonological string *questo leopardo* ‘this leopard’ cannot be modified any further. Therefore, even though the verb ends with a stressed vowel and the object begins with a consonant followed by a vowel, Raddoppiamento Sintattico may not apply.

Now, let us consider the non-branching object in Italian. If the object is non-branching or consisting of one word, Raddoppiamento Sintattico applies optionally to the initial consonant of the object. That is, the p-phrase containing the non-branching object may ‘restructure’ into the p-phrase containing the verb:

(13) Se prenderá      qualcosa      prenderá      tordi  
 if catch.Fut.3sg. something      catch.Fut.3sg.      thrushes  
 (                    ) $_{\Phi}$     (                    ) $_{\Phi}$  (                    ) $_{\Phi}$     (                    ) $_{\Phi}$   
 (                    ) $_{\Phi}$     (                    ) $_{\Phi}$  (                    ) $_{\Phi}$   
 ‘If he catches something, he will catch thrushes.’

Nespor and Vogel (1986:172)

Suppose that the syntactic derivation for ‘catch something’ reached the following stage of the derivation.

(14) [<sub>VP</sub> catch-*v* [<sub>VP</sub> <catch> something ]]

Suppose that the sister of *v* is Spelled-Out:

- (15) Spell-Out (Sister of *v*)
- a. Linear Order: <catch> something
  - b. Mapping to  $\Phi$ : something

Here, the phonological string of ‘something’ is mapped to  $\Phi$ :

(16) *qualcosa* ‘something’

Under (4), the phonological string *qualcosa* is not legitimate. Therefore under (5), it can be mentioned later.

Suppose that the syntactic derivation reached the following stage:

(17) [<sub>CP</sub> C [<sub>IP</sub> pro catch-*v*-Infl [<sub>VP</sub> <catch-*v*> [<sub>VP</sub> <catch> something ]]]]

Spell-Out applies to the sister of C:

- (18) Spell-Out (Sister of C)
- a. Linear Order: pro catch-*v*-Infl <catch-*v*> <catch>
  - b. Mapping to  $\Phi$ : catch



First, *bákajúna* ‘helped’ is mapped to  $\Phi$  as in (21a). Second, *abokazi* ‘workers’ is mapped to  $\Phi$  as in (21b). Under (5), the phonological string *bákajúna*, which was mapped to  $\Phi$  before, cannot be mentioned in (21b) and it cannot trigger the deletion of the H tone in *abakózi*. Note that even though the phonological string in (21a) containing only one phonological word appears to be illegitimate under (4), (20b) shows that the non-branching verb (phrase) can be phrased alone. Therefore, the string in (21a) should also be legitimate at this point of the derivation, and may not be mentioned in (21b).

I suggest that the relevant phonological rule, High Deletion, is in fact an intonational phrase phenomenon, but not a p-phrase phenomenon. If so, the subject is not necessarily phrased separately with the verb (phrase) at the intonational phrase level.

Then, the next question is why the branching subject is not phrased with the verb in (20b). Zec and Inkelas (1990: section 3.1) observe that topicalized constituents have to be branching in Serbo-Croatian. That is, a non-branching constituent cannot be topicalized:

- (22) a. *taj čovek voleo=je mariju*  
           that man   loved=aux Mary  
           ‘That man loved Mary’                   Zec and Inkelas (1990: 373)
- b. *\*petar voleo=je mariju*  
           Petar loved=aux Mary                   Zec and Inkelas (1990: 373)

According to Zec and Inkelas (1990), the sentence initial element is topicalized here. In (22a), the topicalized element ‘that man’ is branching and the sentence is well-formed, while in (22b), “Petar” is non-branching and the topicalization is disallowed.

Keeping this in mind, suppose that the following three conditions hold in Kinyambo:

- (23) a. The subject has to be topicalized if possible.  
 b. The topicalized constituent has to be branching.  
 c. The topic corresponds to an intonational phrase.

I assume (23a) since the subject seems to be interpreted as a topic in many Bantu languages. I assume (23c) since Frascarelli (2000) shows that in Italian a topicalized constituent corresponds to an intonational phrase (See also Chapter 4).<sup>1</sup>

Under (23), the subject is topicalized when it is branching, but it is not topicalized when it is non-branching. If this is a correct analysis of Kinyambo, then the apparent rightward restructuring is not a counterexample of (4) and (5), and we can maintain the claim in (4) and (5) that the phonological phrasing is a reflex of syntactic derivation. Thus in (20b), the branching subject is topicalized, and corresponds to an intonational phrase. Because of the intonational phrase boundary after the topicalized subject, High Deletion does not apply to *bakúru* ‘mature.’ On

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<sup>1</sup> Frascarelli (2000) also shows that in Italian an intonational phrase containing a topic has to be branching, otherwise the (non-branching)

the other hand, in (20a), the subject is non-branching, and cannot be topicalized under (23b). Therefore there is no intonational phrase boundary after the non-branching subject, and High Deletion applies to *abakózi* ‘workers’ due to the presence of the following V within the same intonational phrase.

Lastly, let us consider the following Kinyambo examples again:

- (24) a. (Nejáworech’ ábakoz’ émbwa)<sub>φ</sub>  
 He-will-show workers dog  
 ‘He will show the workers the dog.’  
 cf. *abakózi* ‘workers (isolation)’ Bickmore (1990: 15)
- b. (Nejákworech’ ómukama w’abakózi)<sub>φ</sub> (émbwa)<sub>φ</sub>  
 He-will-show chief of workers dog  
 ‘He will show the chief of the workers the dog.’  
 Bickmore (1990: 15)

These are double object constructions. If the indirect object is non-branching, then it is phrased with the verb and direct object, as shown in (24a). If it is branching, it is phrased with the verb but not with the direct object, as shown in (24b).

Seidl 2000 makes an interesting generalization for the double object constructions in Bantu languages (see also McGiniss 2000). She argues that the verb (V), the indirect object (IO), and the direct object (DO) are phonologically phrased together in symmetric languages, while the V and

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intonational phrase undergoes restructuring. This is consistent with the assumption (23b).



the IO are phrased together excluding the DO in asymmetric languages.<sup>2</sup> And she argues that this is due to the syntactic difference between the two types of languages (Baker 1988). She argues that both the IO and DO move up to a domain of Spell-Out where the V is spelled-out in the symmetric languages. Thus, all of the V, IO and DO are spelled-out together, and correspond to a single p-phrase. In asymmetric languages, DO stays in situ, and it is spelled-out independently before V and IO are spelled-out, resulting in the phonological phrasing where V and IO are phrased together and DO is phrased alone.

Along these lines, I assume that in Kinyambo, which is symmetric (Seidl 2000: 89), the double object constructions have the following syntactic structure (Collins 1997:56):

(25) [<sub>CP</sub> C [<sub>IP</sub> Infl [<sub>νP</sub> IO *ν* [<sub>ApplP</sub> DO <IO> Appl [<sub>VP</sub> V <DO>]]]]]

Here, Applicative Phrase (ApplP) is located between *ν*P and VP. The head of ApplP assigns a theta-role to IO, and checks the Case feature DO when DO moves to check the OCC feature of Appl. V-movement is not represented here, but it moves to Infl. Within the proposed theory, Spell-Out of the sister of *ν* does not map anything to  $\Phi$ , since the DO is the initial element in the sister of *ν*, and escapes the mapping to  $\Phi$ . Spell-Out of the sister of C maps the phonological string of the following elements to  $\Phi$ :

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<sup>2</sup> Seidl (2000: 89) notes two exceptions. In Chaga, which is symmetric, the direct object and the indirect object are phrased separately, and in Chichewa, which is asymmetric, they are phrased together.

(26) V IO DO

Note that Subj escapes the mapping to  $\Phi$  here.

Under these assumptions, phrasing in (24a) is straightforward. All of the V, IO and DO are phrased together, as expected.

Now let us consider (24b) where IO is branching. Suppose that not only the subject, but also the object undergo topicalization under (23a, b). Suppose also that the topicalization of the object applies within IP (see Jayaseelan 2001 for IP-internal Topic Phrase).

(27) [<sub>CP</sub> C [<sub>IP</sub> Infl [<sub>TOPP</sub> IO Top [<sub>VP</sub> <IO> v [<sub>AppIP</sub> DO <IO> Appl  
[<sub>VP</sub> V <DO>]]]]]]]

Given that a topic corresponds to an intonational phrase, we can account for the fact that the High Deletion does not apply to ‘workers’ within IO. However, it is not clear why High Deletion applies to the verb adjoined to Infl (That is, why the verb is phonologically phrased with IO). It is perhaps because of some condition on branchingness of the intonational phrase (Frascarelli 2000), and the verb may undergo restructuring of intonational phrase to the right. I leave this problem open for the more systematic analysis of syntax and phonological phrasing in these languages.

It remains to see if the strictly derivational approach under (4) and (5) would turn out to be true, without recourse to the rightward restructuring of phonological phrase.

Lastly, I briefly speculate about the Strict Layer Hypothesis under the assumption that phonological phrases can be eliminated. Since the Strict Layer Hypothesis relies on the existence of phonological phrases, the elimination of the phonological phrases indicates the elimination of the Strict Layer Hypothesis. The situation is similar to the elimination of X-bar theory in favor of the Bare Phrase Structure (Chomsky 1994) in syntactic theory. The Bare Phrase Structure theory makes it possible to give an account for the representational conditions stipulated by the X-bar theory, such as phrasal levels, endocentricity and so on, in terms of the nature of the syntactic derivation. Similarly, it is expected that the layeredness of the prosodic constituency should not be stipulated by the Strict Layer Hypothesis, but rather be accounted for in terms of the cyclic application of Spell-Out/TRANSFER. As is observed in the literature (e.g., Nespor and Vogel 1986), the intonational phrase can be an n-ary branching, consisting of one or more phonological phrases. Thus, the prosodic constituent consisting of one or more phonological strings that have been mapped to the phonological component should be regarded as an intonational phrase.

The intonational phrase is delimited in terms of not only syntactic, but also semantic and stylistic factors, and it shows a larger degree of variability than the phonological phrase. Within the framework of the Minimalist Program which I am adopting here, the operation TRANSFER connects syntax with phonology and semantics. (Note that Spell-Out is part of TRANSFER.) Then it is likely that TRANSFER defines a prosodic constituent consisting of one or more phonological strings that have been mapped to the phonological component. I suggest that

TRANSFER gives instructions to the phonological component so that the phonological strings that have been mapped are grouped together in terms of some syntactic, semantic, and stylistic properties. Then it follows that the layeredness of the prosodic constituency can be accounted for by the grouping function of TRANSFER. That is, the prosodic constituency is not given by the representational schema or the Strict Layer Hypothesis, but it is created by TRANSFER.

One of the consequences of the elimination of the X-bar theory was that the multiple specifiers are no longer prohibited, rather they are expected (Chomsky 1994, 1995, Koizumi 1995, Ura 1994, 2000) since there is no schematic or representational condition on the number of the specifiers. Similarly, it is expected that the recursion of the phonological phrases should be possible if the Strict Layer Hypothesis, which prohibits the recursion of the phonological phrases, is eliminated. In fact, Truckenbrodt (1995, 1999) argues that the recursive phonological phrasing should be possible to account for the overlapping of the prosodic domain (See footnote 7 in Chapter 2). Such recursive phonological phrasing can be taken to be a consequence of the elimination of the Strict Layer Hypothesis and that of phonological phrases in general.

I leave open the technical elaboration of the layeredness of the prosodic constituency within the p-phrase-free syntax-phonology mapping theory for my future research.

### **3. Summary**

In this chapter, I speculated about the elimination of phonological phrases within the strictly derivational approach to phonological phrasing. I

showed that the phonological phrases can be eliminated as long as the rightward restructuring can be accounted for on independent grounds. I further speculated about the status of the Strict Layer Hypothesis under the assumption that the phonological phrases can be eliminated. I suggested that the Strict Layer Hypothesis be eliminated in favor of the grouping function of TRANSFER. I also suggested that the recursive phonological phrasing should be possible if the Strict Layer Hypothesis is eliminated.

## CHAPTER SIX

### CONCLUSION

In this dissertation, I proposed a theory of syntax-phonology mapping within the framework of the Minimalist Program. In Chapter 1, I pointed out the Assembly Problem. If Spell-Out applies multiply, the linear order between the two units of Spell-Out cannot be defined since they do not share any element by virtue of which they are linearly ordered. I proposed that the initial element in the domain of Spell-Out escape the mapping to the phonological component so that it is accessible to the next domain of Spell-Out. The two units of Spell-Out are linearly ordered by virtue of the initial element, which is accessible to both of the two units of Spell-Out. Based on this proposal, I suggested that the string that is mapped to the phonological component corresponds to a phonological phrase. Crucially, the initial element that escaped the mapping to the phonological component is mapped to the phonological component by the next Spell-Out. The proposed theory of phonological phrasing is a null hypothesis in that it does not need to refer to any particular syntactic information. The phonological phrase is formed as a result of the mapping to the phonological component. This approach is possible only in the derivational theory of syntax-phonology mapping which adopts Multiple Spell-Out. Any representational theory of syntax should refer to some syntactic information to form a phonological phrase, otherwise it cannot divide a phonological string into phonological phrases. Therefore, the proposed theory of phonological phrasing argues for the derivational theory of syntax.

In Chapter 2, I examined some crosslinguistic variation of phonological phrasing within the proposed theory of phonological phrasing. I argued that the prosodic condition that a phonological phrase contain two or more phonological words triggers restructuring of phonological phrases. I proposed that the prosodic condition is parameterized. Thus it is operative in Italian while it is not in French. I also proposed that the direction of the restructuring be parameterized. Thus it is to the left in Italian while it is to the right in Kinyambo.

In Chapter 3, I examined the phonological phrasing in Japanese DP. Under the assumption that the restructuring is to the left, I showed that the derivational approach to syntax plays a crucial role in accounting for the phonological phrasing. That is, restructuring applies each time a phonological string is mapped to the phonological component.

In Chapter 4, I examined focus and its effect on phonological phrasing in focus constructions in KiYaka and Sandawe. I proposed that the IP-external FocP is a strong phase. For the focus constructions in KiYaka, I proposed that the verb moves to the head of FocP, and gave an account for the fact that the verb and the focused constituent are phonologically phrased together within the proposed theory of syntax-phonology mapping. I also showed that the escapement of the initial element in the mapping to the phonological component accounts for the phonological phrasing of the post-verbal focus constructions. For the focus construction in Sandawe, I proposed that the verb does not move to the head of FocP, unlike KiYaka. I also proposed that the IP-external FocP may iterate, and that there is an IP-internal FocP to account for the word order variation and phonological phrasing in Sandawe.

In Chapter 5, I speculated about the elimination of the phonological phrases in favor of the strictly derivational application of Spell-Out. I showed that phonological phrases can be eliminated as long as the rightward restructuring can be accounted for independently. I also speculated about the elimination of the Strict Layer Hypothesis. I suggested that the layeredness of the prosodic constituency should not be stipulated, but rather be accounted for in terms of TRANSFER. I argued that the recursion of the phonological phrasing should in principle be possible given the elimination of the Strict Layer Hypothesis.



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