

Against the projection principle in government phonology*

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Park, Heecheon. 2004. Against the projection principle in government phonology. *Studies in Phonetics, Phonology, and Morphology*. 10.2. 241-256. This paper aims to explore phonological phenomena in languages which expose problems pertaining to the Projection Principle in Government Phonology. Providing crosslinguistic phenomena in Arbore, as well as cases in Tangale and Zoque, where the Projection Principle cannot hold, this paper supports Park & Michaels (1997)'s idea that the Projection Principle should be excluded from Government Phonology. Park & Michaels argued that the Projection Principle should be replaced with a derivational account of government. Following their idea, this paper investigates the reduction phenomena in Arbore and shows that the data in Arbore also can be another motivation to eliminate the Projection Principle in Government Phonology. (Honam University)

Keywords: Government Phonology, Projection Principle, reduction phenomena in Arbore, Segmental Complexity, Government Licensing, Extended theory of Government Phonology

1. Introduction

One goal of linguistic theory is to uncover the universal principles which constrain the class of attainable grammars. Recent work in phonology has pursued this goal in terms of the principles and constraints provided by Universal Grammar. One line of this work is found in Government Phonology (Kaye, Lowenstamm & Vergnaud, 1985, 1990, henceforth KLV), in which it is proposed that syllables are bound together in terms of a relation of government. This paper explores how the government approach can be saved in other crosslinguistic phenomena where the Projection Principle cannot hold. In Park & Michaels (1997), it has already been argued that the Projection Principle, which requires that government is defined in lexical representations and remains constant throughout a derivation, could not hold in Korean, since the surface sequence satisfies interconstituent government while the underlying sequence does not. Rather the derivations satisfy interconstituent government by switching government relations. Thus, by reanalyzing the case of Tigrinya which motivated the Projection Principle, Park & Michaels explored Korean linguistic phenomena without Projection Principle. This paper strongly supports that the Projection Principle should be excluded from Government Phonology, dealing with other crosslinguistic phenomena in which Projec-

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tion Principle cannot hold. For this, in the next section, the theoretical background of Government Theory will be examined with explicating some basic principles and representations.

2. Theoretical background

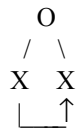
2.1 Theory of government phonology

Government in phonology is a universal relation holding between two positions (KLV 1990). KLV define a governing domain as follows:

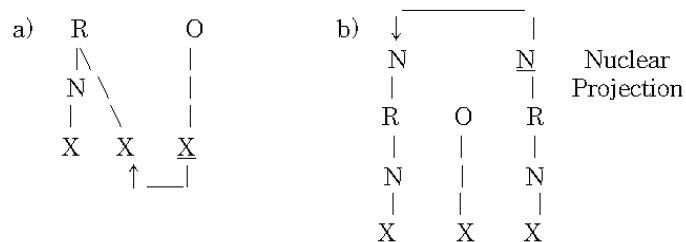
- (1) A syllabic constituent is a governing domain where the government relation is characterized as;
 - a) strictly local
 - b) strictly directional

The direction of government depends on whether it is constituent government or interconstituent government. Constituent government is head-initial. Thus, the direction of government between two points of a branching constituent is left to right as shown in (2). Interconstituent government, on the other hand, is head-final. Thus, its direction is right to left as shown in (3). In (3b), the nonadjacency of two nuclei for government purposes is gotten around by positing a level of nuclear projection where adjacency is satisfied.

- (2) Constituent Government: (where O=Onset)



- (3) Interconstituent Government: (N=Nucleus, R=Rhyme)



Governors and governees require certain types of segments in order to fulfill their government requirements. The governing properties of

segments are defined by charm, a kind of sonority measure. Generally speaking, segments with negative charm such as stops and non-strident fricatives are potential governors and charmless segments such as sonorants are potential governees, as shown in (4).

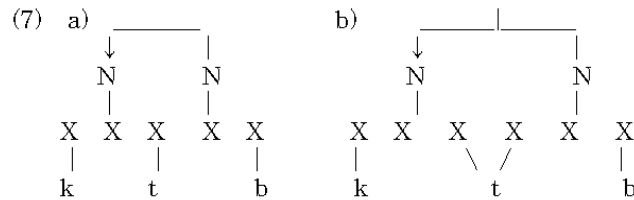
- (4) a) Governors: negatively charmed segments (obstruents or fricatives;
e.g., p, t, k, f)
b) Governees: charmless segments (sonorants; e.g., m, n, l)

2.2 Principles in government phonology

Within Government Theory, some principles and constraints such as Empty Category Principle and Proper Government are proposed as shown in (5) and (6) (KLV 1990: 219).

- (5) Empty Category Principle: A position may be uninterpreted phonetically only if it is properly governed.
(6) Proper Government : (i) The governor may not itself be governed, and
(ii) the domain of proper government may not include a governing domain.

By these principles, they account for Moroccan Arabic forms such as [(tan) ktib] 'I write' and [kittib] 'he made x write' as follows (Kaye 1990a, 1990b):



That is, in (7a), the final nucleus governs the first nucleus, and hence the first nucleus is not realized phonetically under the condition of the Empty Category Principle. Only the final nucleus, not being properly governed, is pronounced. Thus, (7a) is realized as [ktib]. In (7b), on the other hand, not only the final nucleus, but also the first nucleus must be realized. Since the intermediate geminate constitutes a domain of interconstituent government, it makes proper government between the two nuclei impossible. Thus, (7b) is realized as [kittib].

KLV also propose the Projection Principle in the following.

According to this principle, the government relations should hold at all stages of a derivation. By a version of the Projection Principle, we can assume that if there is a well-formed governing relation between two adjacent consonants in the surface form, there should also be a well-formed governing relation between these two adjacent consonants in the lexical form. KLV propose this principle to account for the apparent indifference of consonant sequences to government relations in Tigrinya (9), where there are no branching onsets or codas.

- KLV propose that the infinitives in (9) have an empty nucleus lexically between the first two consonants of the root, as shown in (10), and hence have no governing relation lexically between those consonants.

- Here, the empty nucleus v° is governed by the following nucleus /a/, and hence it is not realized phonetically by the Empty Category Principle in (5). KLV argue that no governing relation is established in the surface form, where the vowel is not realized, because of the Projection Principle. Thus, if there is no governing relation between two consonants lexically, there is also no governing relation between them in the surface form and vice-versa.

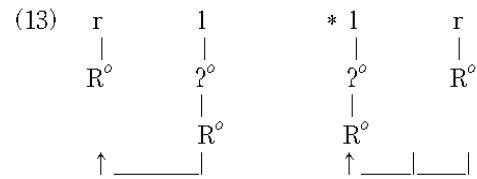
KLV (1985) propose an additional determinant of governing capacity: a segment's complexity. To assess segmental complexity, they represent consonants internally by the unary elements given in (11).

- Based on this complexity distinction, Harris (1990) proposes that all

segments in government configurations should satisfy the Complexity Condition in (12).

- (12) Let α and β be segments occupying the positions A and B respectively. Then, if A governs B , β must be no more complex than α .

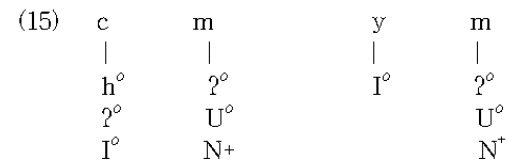
For example, according to him, the reason the liquid [l] may govern [r], but not vice-versa, is that [l] is more complex than [r], as is illustrated in (13).¹



Harris proposes that certain phenomena are forced by the Complexity Condition (12), according to the two types of operations in (14).

- (14) a) composition: elements spread from one consonant and fuse with elements contained in a neighboring consonant
 b) decomposition: elements are lost from the internal representation of a consonant

He argues that the change of /-cm-/ /-ym-/ in Cushitic language can be explained by decomposition, forced by the necessity to steepen the complexity slope between the governing consonant and the governed consonant, as shown in (15) (see also Harris 1988).



That is, (15) shows that /c/ loses ʔ^o (constriction) and h^o (aspiration), conforming with the Complexity Condition in (12).

Such an analysis, however, does not explain why the decomposition of the first consonant applies rather than composition of the second if all that is at stake is achieving a government relation. In addition, we cannot predict how many internal elements are dropped for decomposition. This

¹ In this paper, I skip the internal representation of each consonant. For details, please refer to Harris (1990).

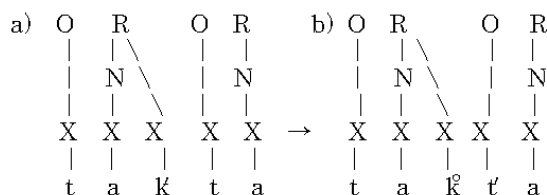
analysis also does not explain why only specific element(s) are affected and not some other element(s). In order to clarify these problems, Park (1996) and Park & Michaels (1997) extend the Government Theory, adopting the Markedness Theory in the Syllable Structure approach. In the section 5, I will present the Extended Theory of Government Phonology in details. Now, let us move on to the phenomena in which the Projection Principle cannot hold.

3. Counterexamples against the projection principle

3.1 Korean consonant cluster phenomenon

The Korean phenomenon which shows interactions between two obstruents as shown in (16) falsifies the Projection Principle in phonology (see Chung 1980, C.-B. Kim 1974, C.-W. Kim 1979, and Rhee 1991).

(16) /tak'+ta/ → takt'a 'to clean' cf) /tak'+im/ → tak'im



Here it becomes necessary to define more finely the interconstituent governing relations between two negatively charmed segments. According to KLV (1990), for two obstruents of apparently equal charm to be in a government relation, they must conform to the sequence C^o-C^- shown in (17), where C^o is a neutral obstruent, and C^- is a tense or aspirated obstruent containing the element H- (stiff vocal cords).

(17) Interconstituent Government: C^o-C^-

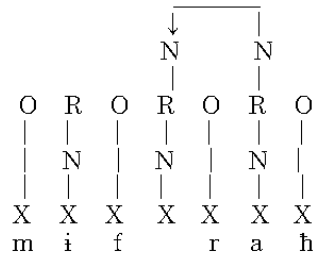
Where C^o = neutral obstruent (lax), C^- = tense or aspirated
(contains the element H^-), and the superscript indicates
charm value: X^o = neutral, X^- = negative, X^+ = positive.

Given this, the surface form [takt'a] in (16b) satisfies the C^o-C^- government relation. The lexical form in (16a), however, violates the government relation in (17). To repair it, tense /k/ of the stem must be lax, and lax /t/ of the ending must be tensed, as shown in (16b), which will give the C^o-C^- representation required by (17). In this case, however, the Projection Principle, in which the government relations must hold at all stages of a

derivation, cannot hold, since the surface sequence satisfies interconstituent government while the underlying sequence does not.

To solve this problem, Park & Michaels (1997) propose replacing the Projection Principle with a derivational account of government (see also Park 1996). Thus, in order to analyze Korean phenomenon without the Projection Principle in Government phonology, they reanalyze the Tigrinya data which motivated the Projection Principle. That is, following KLV (1990), in Tigrinya, they posit an empty nucleus between the two consonants in question lexically, as shown in (10). The empty nucleus is properly governed (6) by a following phonetically realized nucleus /a/, and hence it is not pronounced according to the Empty Category Principle (KLV 1990) in (5). Here, as shown in (18), though the empty nucleus is not phonetically realized, the empty nucleus position remains and intervenes between the two consonants in the surface form.

(18)



Under the adjacency requirement of government, there can be no government relation that holds between the consonants of the medial clusters separated by the uninterpreted nucleus position in the surface form. Thus, the Empty Category Principle and the adjacency requirement of government do the work in Tigrinya. The Projection Principle does no work, even in KLV's account, and can be abandoned. Given this much background in Government Phonology, I now turn to other languages such as Tangale and Zoque to support the idea that the Projection Principle does no work, and can be abandoned in Government Phonology.

3.2 Analysis of Tangale based on the government licensing theory

In order to account for the simplification of a consonant cluster preceding an unrealized empty nucleus, Charette (1988a, 1990) argues that for an onset to govern a coda, two properties are needed: charm and licensing. Thus, she proposes the following condition (see also Yhshida, 1990):

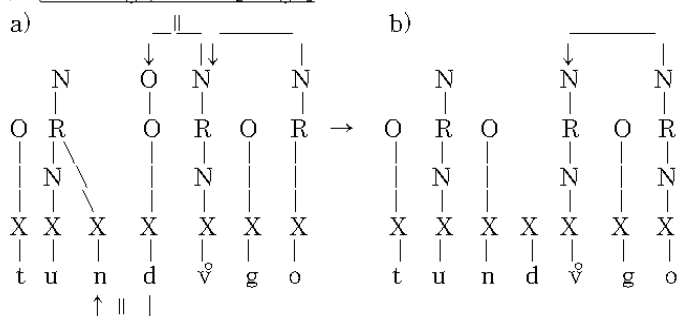
(19) Government Licensing

A non-nuclear head (onset) can govern a complement (coda) only if
 (a) it has the required charm value of complexity, and (b) it is government-licensed by its nucleus.

However, in order to government-license an onset, a nucleus cannot be properly governed. Thus, at the licenser projection level, a governing onset acquires its governing properties through licensing by the nucleus following it.

Based on this Government Licensing Theory, Charette (1988b, 1991) shows that the derivational form [tungo] (/tunde+go/ 'delayed') in one of the dialects of Tangale, can be illustrated as follows:

(20) /tunde+go/ → [tungo]



Charette posits an empty nucleus between the second and third consonant. If the empty nucleus v^0 is properly governed by a following nucleus, it is not pronounced. However, an empty nucleus which is properly governed by a following nucleus cannot license its onset to govern, and hence the onset cannot govern its complement, coda. Hence /d/ cannot govern /n/ in (20). The rhymal complement /n/, having no governor, dissociates from the rhyme and attaches to the onset vacated by /d/ as shown in (20).

This analysis shows that the Projection Principle cannot hold for Tangale as it does not for Korean. According to Harris (1990), one corollary of the Projection Principle is that resyllabification is not countenanced by the Government Theory. However, Charette's analysis shows exactly such a case, since the rhymal complement /n/ is resyllabified, dissociating from the rhyme and attaching to the onset vacated by /d/ in (20). Thus, Charette's analysis based on Government Licensing Theory gives strong evidence that the Projection Principle does not hold in phonology.

3.3 Phenomena of metathesis in Zoque

In Zoque (Wonderly 1951, Dell 1980, Michaels & Tiedeman 1986, and Park 1990) metathesis occurs between /y/ and a following /p/ at morpheme boundaries as illustrated in (21).

- (21) popya ‘run, 3sg. Pres’ /poy+pa/
 cf) poyu /poy+u/ ‘he ran’

As shown in (22), where complex onsets comes in word-initial position, this language has complex onsets within a constituent and its complex onsets are syllabified into a branching onsets which corresponds to constituent government.

- (22) mbuhtu ‘go out 1sg. Prog’
nduhu ‘shoot 1sg. Prog’

Given this, we can note that onset clusters in Zoque belong to constituent government in which the direction of government between two segments of a branching onset is left to right as shown in (2). In this language, as in the case of Korean, the underlying sequence does not satisfy constituent government while the surface sequence does. That is, the surface form [popya] in (21) satisfies the constituent government relation, since *p* can govern *y* in the given surface forms and the direction of their governing relation goes from left to right corresponding to constituent government. The lexical form in (21), however, violates the government relation. To repair it, the underlying sequence /poy+pa/ are realized as [popya] switching the government relations in the consonant sequences. However, the Projection Principle cannot hold, since the surface sequence satisfies constituent government while the underlying sequence does not. Keeping this in mind, now let's move on the reduction phenomenon in Arbore, which shows that the Projection Principle cannot hold as it does not for other languages mentioned above.

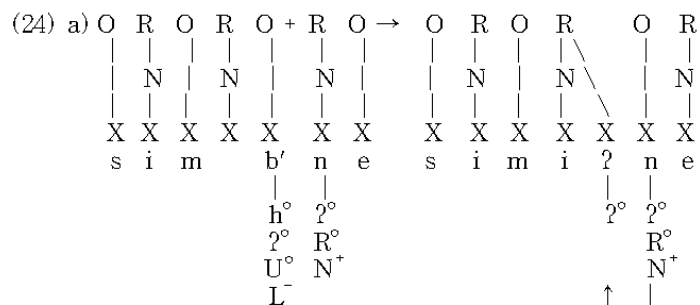
4. Reduction phenomenon in Arbore

In Arbore, an eastern Cushitic language spoken in Ethiopia (all data due to Hayward 1984), potential complexity violations are resolved through the operation of various reduction processes (Harris 1990). One of these involves the total regressive assimilation of stem-final glottalised stops to a following suffix consonant. In verbal paradigms shown in (23), we can find glottalised stops being reduced to *ʔ*, when these stem-final consonants come before suffix-initial consonant in the first plural form:

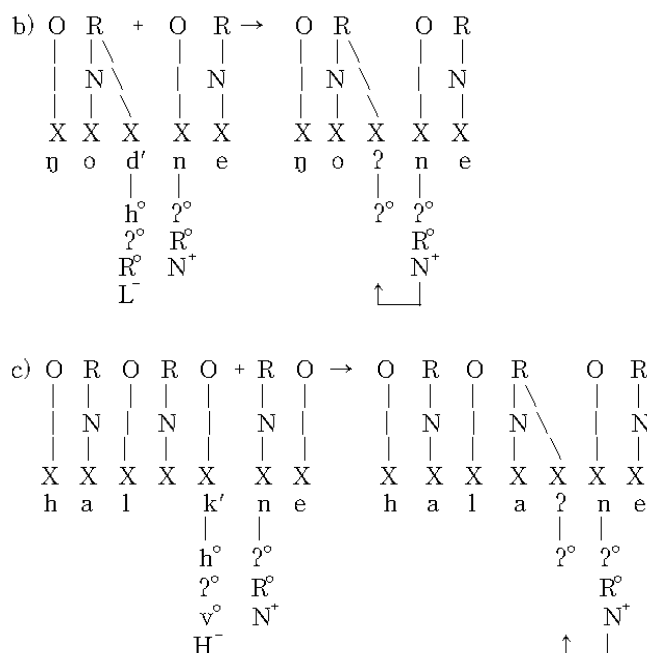
(23) Perfect affirmative

1st. sg	1st. pl	2nd. sg	
a) sim <u>b</u> 'e	sími?ne	simi?te	'sweat'
b) tul <u>d</u> 'e	túli?ne	tuli?te	'be sick'
ɲo <u>d</u> 'e	ɲó?ne	ɲo?te	'pinch'
hi <u>d</u> 'e	hí?ne	hi?te	'gird on'
c) ha <u>k</u> 'e	hála?ne	hala?te	'be hungry'

Specifically, the verb stem final consonants, /b/ in (23a), /d/ in (23b) and /k/ in (23c), are realized as ? before suffix-initial consonant *n* in the first plural form. According to Harris, all of these processes take place stem-finally before a consonant-initial suffix. He suggests that a suffix-initial consonant directly abuts on a stem-final consonant without intervening nucleus in this language. Thus, we can assume that cases of the first plural forms are realized as follows: /simb'+ne/ [sími?ne], /tuld'+ne/ [túli?ne], /ɲod'+ne/ [ɲó?ne], /hid'+ne/ [hí?ne] and /halk'+ne/ [hála?ne]. These data, however, violate the Projection Principle, in which government is defined in the lexical representation and remains constant throughout a derivation, since the interconstituent government relation between the verb stem final consonant and a suffix-initial consonant in Arbore exists in the surface form, but not in the lexical form as shown in (24).²



² Here, the position of the empty nucleus is posited in the lexical forms such as /simøb'/ and /haløk/ in (24a) and (24c), since vowels are realized in the surface form (i.e., [sími?ne] and [hála?ne]).



That is, in the lexical forms of (24), the consonant *n* cannot govern the preceding stem final consonants, *b'*, *d'* and *k'* under the Complexity Condition in (12), since *n* is less complex than its governees. In the surface representation, however, the segments, *b'*, *d'* and *k'*, lose all the elements except the constriction element *?*^o, giving the well-formed governing relation between the two consonants. This can happen under the assumption of one operation (i.e., decomposition) shown in (14b). According to a version of the Projection Principle, if there is a well-formed governing relation between two adjacent consonants in the surface form, there should also be a well-formed governing relation between these two adjacent consonants in the lexical form. However, in Arbore, government is established during the derivation, as it is for Korean and Zoque. It does not hold in the lexical representation. Since the surface sequence satisfies interconstituent government while the lexical sequence does not, the Projection Principle cannot hold.

So far, I have analyzed Arbore reduction phenomenon within the Government framework and showed that the data of this language can be another motivation to eliminate the Projection Principle. The analysis in (24) based on the segmental complexity, however, does not explain why the decomposition of the first consonant applies rather than composition of the second to achieve a government relation. This analysis also does not explain why only specific elements are affected and not some other element.

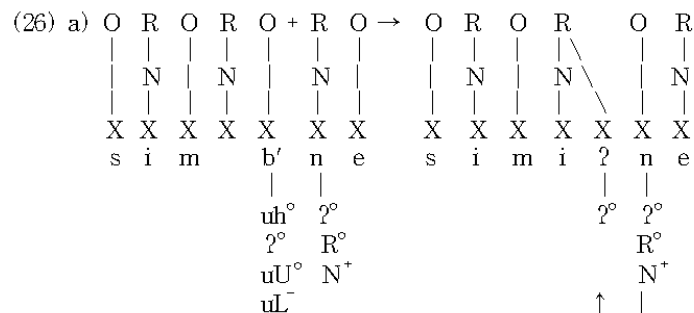
5. Proposed analysis in the extended theory of GP

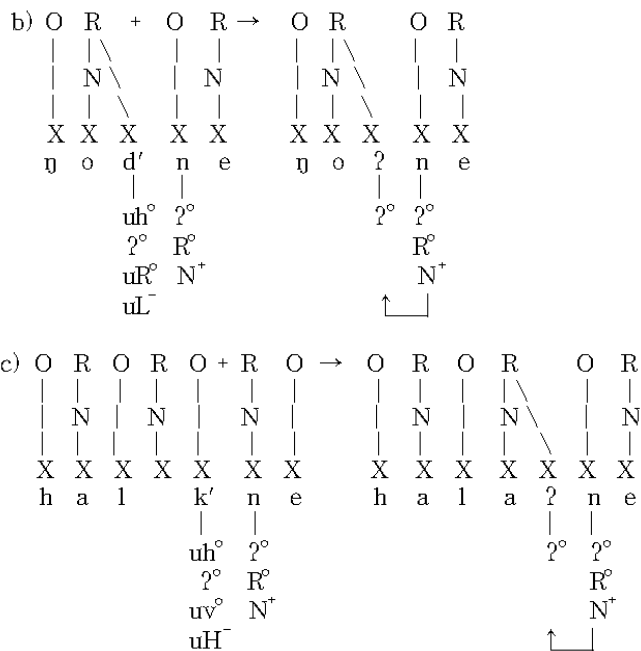
To address the problem surrounding segmental complexity, composition and decomposition outlined above, I propose to adopt Park & Michaels (1997)'s proposal which extended Government Phonology. Park & Michaels extend the lexical representations in Government Phonology along the lines of the Markedness account in Michaels (1989a, 1989b, 1995). According to them, alternating segments are represented by having unmarked or marked elements for the elements which alternate, while nonalternating segments are represented by having concrete elements. The unmarked and marked elements can be interpreted by default interpretation, which determined by governing relations. The default interpretation of unmarked or marked elements is subject to the conditions shown in (25).

(25) Default Interpretation

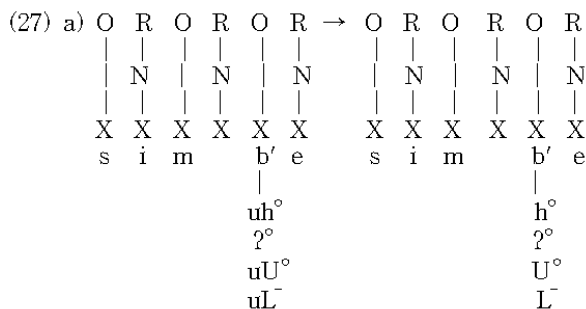
- A *marked* element can be realized phonetically by default if and only if it is in a governing position.
- An *unmarked* element can be realized phonetically by default if and only if it is not in a governing or governed position.

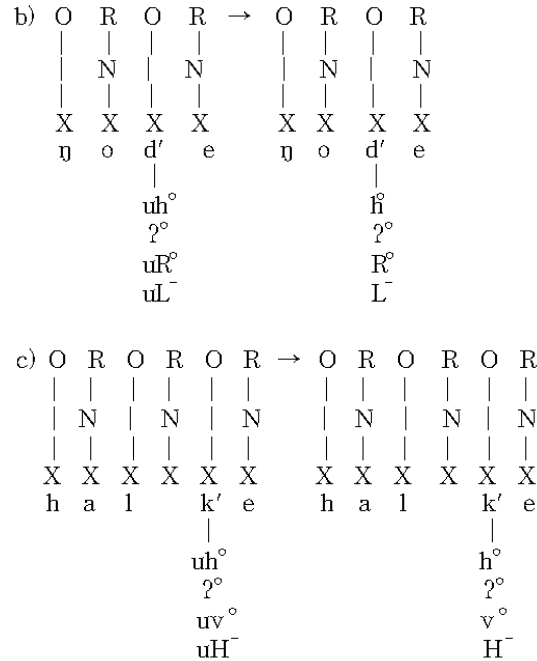
Given this, to address the question of how reduction occurs in Arbore, elements that alternate in the examples in (24) are represented as unmarked or marked lexically. Specifically, all the elements (i.e., h^0 , U^0 , and L) except the constriction element (i.e., $ʔ^0$) of the segment /b/ in (24a) are represented as unmarked (i.e., uh^0 , uU^0 , and uL), since the segment /b/ alternates with $ʔ$. For /d/ in (24b), unmarked elements such as h^0 , R^0 , and L are posited lexically. Finally, the segment /k/ in (24c) are represented as having the unmarked elements, h^0 , v^0 and H . They are illustrated in (26).





(In 26a), the unmarked elements, uh^0 , uU^0 , and uL^- are not realized phonetically on the surface form under default interpretation (25b), since they are unmarked and are in the governed position. Thus, /b/ in (26a) is realized as ? having only constriction element ?^o. Likewise, in (26b), unmarked elements such as uh^0 , uR^0 , and uL^- of the segment d' are not realized under default interpretation (25b), and hence d' is realized as ? having the element ?^o. Finally, in (26c) also, the unmarked elements, uh^0 , uv^0 and uH of k' are not realized by (25b), thereby giving ?. On the other hand, when these verb stem final consonants are not in a governing relation, the unmarked elements are realized phonetically by (25b) as shown in (27):





That is, when there is no governing relation, the unmarked elements can be realized phonetically by default interpretation (25b). Thus, /b'/, /d'/ and /k'/ in (27) are realized as *b'*, *d'* and *k'* in the surface form forced by (25b), since those consonants are not in a governing relation in the first singular form of Arbore.

5. Conclusion

Dealing with other crosslinguistic phenomena in Arbore as well as in Tangale and Zoque, where the Projection Principle cannot hold, I supported the idea proposed by Park & Michaels (1997) that the Projection Principle should be excluded from Government Phonology. Thus, I analyzed those languages by replacing the Projection Principle with a derivational account of government. In addition, in order to account for what motivates and directs the phenomenon of reduction in Arbore, I argued elements of segments involved in an alternation were represented as unmarked lexically. The unmarked elements are realized by default interpretation shown in (25b). In this way I attempted to narrow the gap between Government Phonology and the phenomena to be accounted for.

References

- CHARETTE, MONIK. 1988a. The minimality condition in phonology. *The Journal of Linguistics* 25, 159-187.
- CHARETTE, MONIK. 1988b. *Some constraints on governing relations in phonology*. Ph.D. dissertation, McGill University.
- CHARETTE, MONIK. 1990. Licence to govern. *Phonology* 7, 233-253.
- CHARETTE, MONIK. 1991. *Conditions on phonological government*. Cambridge: Cambridge University Press.
- CHUNG, KOOK. 1980. *Neutralization in Korean: A Functional View*. Ph.D. dissertation. University of Texas, Austin.
- DELL, FRANÇOIS. 1980. *Generative phonology*, Cambridge university press, Cambridge.
- HARRIS, JOHN. 1988. A government-based analysis of lenition. *Paper presented at Generative Phonology Workshop*. University of Leiden.
- HARRIS, JOHN. 1990. Segmental complexity and phonological government. *Phonology* 7, 255-300.
- HAYWARD, DICK. 1984. *The Arbore language: a first investigation*. Hamburg: Helmut Buske.
- KAYE, JONATHAN. 1990a. Coda Licensing. *Phonology* 7, 301-329.
- KAYE, JONATHAN. 1990b. Government in phonology: The Case of Moroccan Arabic. *The Linguistic Review* 6, 131-159.
- KAYE, JONATHAN, JEAN. LOWENSTAMM. 1982. On the internal Structure of the Rime. *Paper presented at the 5th GLOW Colloquium*, paris.
- KAYE, JONATHAN, JEAN. LOWENSTAMM, & JEAN-ROGER, VERGNAUD. 1985. The internal structure of phonological elements: A theory of charm and government. *Phonology* 2, 305-328.
- KAYE, JONATHAN, JEAN. LOWENSTAMM, & JEAN-ROGER, VERGNAUD. 1990. Constituent structure and government in phonology. *Phonology* 7, 193-231.
- KIM, CHOONG BAE. 1974. Tensification Revisited. *Language Research* 10:2, 129-142.
- KIM, CHIN WOO. 1979. Neutralization in Korean Revisited. *Studies in the Linguistic Sciences* 9, 147-155.
- RHEE, SANG JIK. 1991. Neutralization Revisited. *Harvard Studies in Korean Linguistics* 4, 171-180.
- MICHAELS, DAVID. 1989a. Pro-segments and syllable structure. *Rivista di Grammatica Generativa* 14, 55-77.
- MICHAELS, DAVID. 1989b. Syllable structure, phonetics and phonology. in *Revue de Phonetique Appliquee*, nos. 90-91, 63-67.
- MICHAELS, DAVID. 1995. A minimalist approach to phonology. Paper presented in *the Proceedings of the XIIIth International Congress of Phonetic Sciences*.
- MICHAELS, DAVID. & ROBYNE, TIEDEMAN. 1986. Rules and Syllable Structure in Zoque. *Paper read at the annual meeting, LSA*, New York.

- PARK, HEEHEON. 1990. On the Analysis of Metathesis in Zoque. *Journal of Language Sciences* 6. 89-102.
- PARK, HEEHEON. 1996. *Government relations in Korean phonology*. Ph.D. dissertation, Connecticut University.
- PARK, HEEHEON. & DAVID, MICHAELS. 1997. Government Switching in Phonology. *Korean Journal of Linguistics* 22. 351-368.
- WONDERLY, WILLAM. 1951. Zoque II: Phonemes and Morphemes. *IJAL* 17. 105-123.
- YOSHIDA, SHOHEI. 1990. *Some aspects of governing relations in Japanese phonology*. Ph.D. dissertation, SOAS.

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