

Government and Derivation in Korean Phonology

Heecheon Park and David Michaels

University of Connecticut

Abstract. This paper proposes a derivational account of tensing and neutralization of obstruents in Korean within the theory of Government Phonology (GP) (Kaye, Lowenstamm and Vergnaud 1990, henceforth KLV; Park 1996). We begin by outlining the relevant tensing and neutralization data in Korean. We point out several problems that need to be addressed in any account of these data. We then set out the central notions of GP, pointing out how adherence to the requirement that government relations remain constant throughout a derivation under the Projection Principle prevents a GP account of tensing and neutralization in Korean, which requires government relations to switch between lexical and phonetic representations. To address this problem, we propose abandoning the Projection Principle, extending lexical representations in GP along the lines of the Markedness Theory approach (Michaels 1989), and adopting the economy principles for derivation of the Minimalist approach (Chomsky 1993; Chomsky & Lasnik 1991). Finally, we summarize the analysis of obstruent phenomena in Korean within GP extended in these ways.

1. **Introduction.** In this paper, we investigate tensing and neutralization of obstruents in Korean within Government Phonology (GP). In Korean, there are four sets of obstruents as illustrated in (1) (C.-W. Kim 1979, Ulrich 1990).

- (1) a. p', t', k', s', c' voiceless tense b. p^h, t^h, k^h, c^h voiceless aspirated
 c. p, t, k, c voiceless lax d. b, d, g, ʒ voiced

The first obstruent of a cluster becomes lax, the second tense, between verb stem and suffix in (2).

- (2) a. tak't'a 'to clean' /tak'+ta/ tak'im /tak'+im/
 b. kapt'a 'to repay' /kap^h+ta/ kap^him /kap^h+im/
 c. cək't'a 'to write' /cək+ta/ cəgim /cək+im/

The right-hand columns provide evidence for the lexical representations of the stem final consonants. Tense (2a) and aspirated (2b) stem-final obstruents are neutralized to lax before a consonant. These obstruents cannot be lax lexically, since lax obstruents are voiced between sonorants in Korean as in (2c). The initial consonant in the suffix /ta/ in (2), is not tense lexically, since it voices between vowels as shown in (3).

- (3) o_{da} 'to come' /o+ta/ ka_{da} 'to go' /ka+ta/

The rules for neutralization, tensing, and voicing are summarized in (4), with details that don't concern us here omitted.

- (4) a. Neutralization (Hong 1987, Chung 1980)
 [+cons] → [-tense, -asp] / ___ {#, C}
 b. Tensing (C.-B. Kim 1974)
 C → [+tense] / C + ___
 c. Voicing (J.-M. Kim 1986)
 [-cont, -tense, -asp] → [+voice] / V ___ V

These rules describe neutralization, tensing and voicing, but they do not explain what

- (9)
- | | | | | | | | | |
|-----|----|----------------|-----|----|----------------|-----|----|----------------|
| p | p' | p ^h | t | t' | t ^h | k | k' | k ^h |
| | | | | | | | | |
| ... | CG | SG | ... | CG | SG | ... | CG | SG |

Given that there are complexity differences among segments, Harris (1990) proposes that all segments in government configurations should satisfy the Complexity Condition in (10).

- (10) 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 .

Thus, the governing consonant must be more complex than its governee, with complexity calculated by the number of elements in a given segment. Harris argues that certain phenomena are forced by the Complexity Condition (10), according to the two types of operations in (11).

- (11) 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

4. A Government Analysis of Korean Tensing and Neutralization. Given this, we can analyze the cases [tapt'a] and [kapt'a] in (2) as in (12).

- (12) a. t a k' . t a → b. t a k . t' a
- | | | | | | |
|----|-----|--|--|-----|----|
| | | | | | |
| CG | ... | | | ... | CG |
| ↑ | x | | | | |
- c. k a p^h . t a → d. k a p . t' a
- | | | | | | |
|----|-----|--|--|-----|----|
| | | | | | |
| SG | ... | | | ... | CG |
| ↑ | x | | | | |

In (12) suffix initial lax /t/ cannot govern stem final tense /k/ or aspirated /p^h/. In (12a,b) tense /k/ loses the CG element (decomposition), after spreading and fusing it with the following segment /t/ (composition), thereby laxing /k/ and tensing /t/. The question arises in (12a,b) of why only the CG element is affected, and not some other element. In (12c,d) aspirated /p^h/ loses the SG element (decomposition). However, composition cannot account for the appearance of the CG element in the surface form of tense [t], since it is absent from neighboring aspirated /p^h/, which /t/ must govern. Finally, the analysis provides no account of the asymmetry between the two cases: why does aspirated /p^h/ lose the SG element without spreading it in (12c,d), differently from tense /k/ losing, but spreading the CG element in (12a,b).

There is still another obstacle to the analysis of Korean within GP. KLV (1990) propose the Projection Principle in (13) to account for the apparent indifference of consonant sequences to government relations in Tigrinya (14), where, like Korean, there are no branching onsets or codas.

- (13) Projection Principle: Governing relations are defined at the level of lexical representation and remain constant throughout a phonological derivation.
- (14) a. mifrah 'to be afraid' Root (frh) /mifvrah/

b. miɾfad 'to be late' Root (rfd) /miɾɾfad/

KLV argue that the infinitives in (14) have an empty nucleus lexically between the first two consonants of the root, and hence, since they are nonadjacent, have no governing relation between them. It follows then from the Projection Principle that if there is no governing relation lexically, there is also no governing relation between them in the surface form even where the vowel is not realized. In Korean, as we have seen, government does not hold in the lexical representation, but is established during the derivation and holds in the surface form. Since the surface sequence satisfies interconstituent government, while the lexical sequence does not, the Projection Principle is violated in Korean.

5. A Derivational Theory of Phonological Government. In Korean, the derivations serve to satisfy interconstituent government. Thus, for reasons of descriptive adequacy, we must drop the Projection Principle and introduce a derivational account of government. That is, in Korean, medial consonant clusters must satisfy interconstituent government, and derivations that do not create good interconstituent government sequences among consonants will crash.

However, if there is no Projection Principle in GP, what about the Tigrinya data. In fact, KLV's analysis appears to us to hold with or without the Projection Principle. Since KLV posit an empty nucleus in Tigrinya between the two consonants in question lexically, as shown in (15), the empty nucleus is properly governed under (16b) by the following vowel and hence it is not pronounced according to the Empty Category Principle (KLV 1990) in (16a).

(15) a. m i f v r a h̃

↑ □

b. m i r v f a d

↑ □

(16) a. Empty Category Principle: A position may be uninterpreted phonetically only if it is properly governed.

b. Proper Government : (i) The governor may not itself be governed, and (ii) the domain of proper government may not include a governing domain.

Here, as shown in (15), though the empty nucleus is not phonetically realized, its position remains and intervenes between the two consonants in the surface form. 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.

6. Extended Government Phonology: Markedness and Economy. To address the problems surrounding segmental complexity, we propose to extend the lexical representations in GP along the lines of the Markedness account in Michaels (1989), and to adopt the economy principles for derivations of the Minimalist approach in

Chomsky (1991, 1993) and Chomsky & Lasnik (1991). In Michaels (1989), related forms are represented identically in the lexicon down to affixes. Lexical representations of nonalternating segments are given concretely with plus or minus values of features as appropriate. Alternating segments are represented by unmarked and marked values for the features which alternate. The unmarked and marked features can be interpreted in two ways; by structural or default interpretation.

We extend this approach to lexical representations in GP. In the case of the unary elements, we propose that default interpretation of unmarked or marked elements is subject to the conditions shown in (17).

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

The Minimalist program requires that derivations be as economical as possible (Chomsky 1991, 1993, Chomsky & Lasnik 1991). Since only the elements *CG* or *SG* are involved in the C° -*C* governing relation in (6), and since governing relations must be satisfied in the most economical way, only *CG* or *SG* are affected in the derivation of the Korean obstruent clusters rather than, for example, the less economical move of converting the first obstruent into a sonorant. To address the question of how tensing and neutralization occur, elements that alternate in the examples in (2) and (3) are represented as unmarked or marked lexically. Specifically, the element *CG* of tense stem final /k/ in /tak/ in (2) is *uCG*, and the lax suffix initial /t/ of /ta/ is *mCG* as illustrated in (18).

- (18) a. t a k' . t a → b. t a k . t' a
 | | | |
 uCG *mCG* ... *CG*

In (18), the tense element *uCG* of stem final /k/ is not realized under default interpretation (17b), since it is unmarked and in a governed position, whereas the tense element *mCG* of suffix initial /t/ is realized by (17a), since it is marked and in a governing position, giving tensing. Thus, [takt'a] in (18b) satisfies the C° -*C* governing relation. The *uCG* of tense /k/, on the other hand, is realized by default interpretation (17b), when it is not in a governing or governed position as shown in the nominative form in (19).

- (19) a. t a k' Ĩ m → b. t a k' Ĩ m
 | |
 uCG *CG*

For /kap^h+ta/ in (2), where the aspirated stem final /p/ is neutralized, the element *SG* of this segment is represented as unmarked *uSG* as shown in (20).

- (20) a. k a p^h . t a → b. k a p . t' a
 | | | |
 uSG *mCG* ... *CG*

In (20), the *uSG* of /p^h/ is not realized by default interpretation (17b), since the /p^h/

