Optimal paradigms in Korean nominal inflection[*]

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Han, Eunjoo. 2002. Optimal paradigms in Korean nominal inflection. *Studies in Phonetics, Phonology and Morphology* 8.2. 303-322. This paper is mainly concerned with surface resemblances shared by paradigm members in Korean nominal inflection. In order to deal with various patterns of paradigms, it is proposed that Optimal Paradigms constraints proposed by McCarthy (2001) be decomposed into subconstraints according to the correspondence relations among paradigm members. It is also shown that the proposal made to analyze the dialects involving palatalization can treat the dialects that exhibit /s/-neutralization equally well. **(Seoul Women's University)**

1. Introduction

It has been reported that in some dialects of Korean, a dental stop in the noun stem-final position is palatalized before suffixes which are not considered proper environments for palatalization (Choi 1998). There are, of course, dialects where palatalization applies normally in nominal paradigms. This paper focuses on the following two questions: (i) what causes the overapplication of palatalization and (ii) how the dialectal differences in nominal inflection can be accounted for.

This paper argues that the overapplication results from the enforcement of surface resemblance within a paradigm and that it can be accounted for in a principled way based on faithfulness constraints on the correspondence relation among paradigm members, introduced by McCarthy (2001). While dealing with different patterns of nominal paradigms, it is proposed that faithfulness constraints on the intraparadigmatic correspondence relation be decomposed into subconstraints according to which two paradigm members stand in the correspondence relation. This new proposal is supported by the presence of another set of nominal paradigms, which involves /s/-neutralization instead of palatalization.

This paper is organized as follows. Section 2 presents the data that will be mainly dealt with throughout the paper, i.e. the various patterns of intraparadigmatic resemblance found in different dialects. Section 3 introduces McCarthy's (2001) Optimal Paradigms theory that will provide

the formal basis for the analysis put forward in the following sections. In Section 4, a new proposal that an Optimal Paradigms constraint should be decomposed into subconstraints is made to account for overapplication of palatalization and dialectal variation in nominal paradigms. A potential alternative account is also considered in this section. Finally, Section 5 concludes the paper.

2. Dialectal variation in nominal inflection

Choi (1998) presents an interesting set of data that exhibits dialectal variation in the nominal inflection. His data specifically concerns what happens when the noun /pat^h/ `field´ is combined with each of the case markers, the nominative /-i/, the accusative /-ɨl/, and the locative /-e/. Choi (1998) reports that five different patterns are found, as shown in (1).[1]

(1) Paradigms of *pat^h* `field´ in five dialects

Dialect	-i `Nom.´	-ɨl `Acc.´	-e `Loc.´
A	pac^{h}i	pat^{h}ɨl	pat^{h}e
B	pac^{h}i	pac^{h}ɨl	pat^{h}e
C	pac^{h}i	pac^{h}ɨl	pac^{h}e
D	pasi	pasɨl	pat^{h}e
E	pasi	pasɨl	pase

According to Choi (1998), Dialect A is spoken in Gyeongsangnam-do, Gyeongsangbuk-do and a large part of Gangwon-do, Dialect B in Gyeonggi-do and a large part of Jeollanam-do and Dialect C in areas such as Sangju, Geumneung, Cheongdo, Mungyeong etc. in Gyeongsangbuk-do. Dialect D is found in Gyeonggi-do, Chungcheongnam-do, some parts of Chungcheongbuk-do and a large part of Jeollabuk-do and Dialect E in Gyeonggi-do and a large part of Chungcheongbuk-do.[2]

The five dialects can be divided into two groups according to whether they involve palatalization or /s/-neutralization in their nominative inflection.[3] In Dialects A, B and C, the noun stem-final consonant is palatalized before the nominative suffix /-i/ but in Dialects D and E, the stem-final

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consonant surfaces as /s/ rather than /c^h/ in the same context. As the primary concern of this paper pertains to the relation between the inflected forms and palatalization, I first deal with the first group of dialects, i.e. Dialects A, B and C and then turn to the second group, Dialects D and E in Section 4.

Let us consider the paradigm of Dialect A. /t/-palatalization, one of the well-known phonological phenomena in Korean, changes dental stops /t, t^h/ into the corresponding palatal stop /c, c^h/ before a high front vocoid /i/ or /y/. /t/-palatalization takes place only across morpheme boundaries.[4]

(2) pat^h + i [pac^{h}i] `field + Nominative′
     k'ɨt^h + i [k'ɨc^{h}i] `end + Nominative′
     kut + i   [kuji]   `to be firm + Adverbializer′
     put^h + i [puc^{h}i] `to stick + Causative′

In this dialect, only the nominative suffix is a high front vocoid. As expected, the stem-final consonant /t^h/ is palatalized only in the nominative inflection and it does not change in the accusative and locative inflection. Thus, what is observed in this dialect is the normal application of palatalization.

The paradigms of Dialects B and C, however, show overapplication of palatalization, i.e. the stem-final dental stop is palatalized before /ɨ/ and /e/, in which palatalization is normally not expected. In Dialect B, overapplication of palatalization occurs only before /ɨ/ but in Dialect C, palatalization overapplies in both contexts.

Thus, the data in (1) leaves us two questions: (i) how the overapplication of palatalization can be dealt with and (ii) how the dialectal difference in the paradigm can be accounted for. In this paper, I propose that this overapplication effect be attributed to the enforcement of surface resemblances among morphologically related words. In the following section, I will briefly introduce the Optimal Paradigms (OP) theory proposed by McCarthy (2001), which I will adopt as a formal model to account for surface resemblance in Korean nominal inflection.

3. Optimal paradigms: McCarthy (2001)

McCarthy (2001) proposes the OP model, which is a formalization of surface resemblance through shared paradigm membership. The OP model incorporates the elements of Transderivational Correspondence Theory (TCT) (Benua 1997) and Uniform Exponence (UE) (Kenstowicz 1996, 1998), which are two recent theories on surface resemblances among morphologically related words.

TCT develops the idea that morphologically related words are required

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[4] /t/ of /kut+i/ in (2) is realized as [j] instead of [c] due to Intersonorant voicing, by which a plain stop is voiced when it is placed between sonorants.

to be phonologically identical by constraints on an identity relation between two surface words. That is, a morphologically derived surface form stands in a relation of transderivational or output-output (O-O) correspondence with its morphologically simplex counterpart, called the base. The evaluation proceeds recursively from the base outward and because of base priority, TCT is inherently asymmetric; the base can influence the phonology of the derived form but not vice versa.

(3) Transderivational (Output-Output) Correspondence (Benua 1997: 27)

$$
\begin{array}{ccc}
 & \text{OO-correspondence} & \\
[root_i] & \rightarrow & [root_i + affix] \\
\uparrow & & \uparrow \\
/root/ & & /root + affix/
\end{array}
$$

IO-correspondence
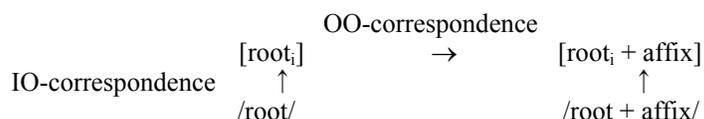
Kenstowicz's (1996) UE approach to surface resemblance is distinguished from TCT in that it is inherently symmetric. It does not assign priority to any member of morphologically related forms but simply requires them to resemble one another.

(4) Uniform Exponence (Kenstowicz 1996: 374)

   Minimize the differences in the realization of a lexical item
   (morpheme, stem, affix, word).

TCT and UE have been complementary; the former has been used to treat the cases of cyclic or stratal phenomena and the latter the phenomena of paradigm uniformity. The OP theory adopts from TCT the idea of using a range of correspondence constraints to enforce surface resemblance. Also from UE, it draws the idea of evaluating surface resemblance symmetrically across inflectionally related forms.
   The central premises of the OP model are as follows.

(5) OP in outline (McCarthy 2001: 5)
   a. Candidates consist of entire paradigm.
   b. Markedness and input-output faithfulness constraints evaluate all members of the candidate paradigm. The violation-marks incurred by each paradigm member are added to those incurred by all the others.
   c. The stem (shared lexeme) in each paradigm member is in a correspondence relation R_{OP} with the stem in every other paradigm member. (That is, for every candidate paradigm P there is a relation R_{OP} on P×P.) There is no distinctive base —rather, every member of a paradigm is a base of sorts with respect to every other member.
   d. There is a set of output-output faithfulness constraints on the R_{OP} correspondence relation.

One of the examples McCarthy gives is the German inflectional paradigm *Bund/Bunde*. The optimal paradigm is selected from the candidate set <[bʊnt], [bʊndə]>, <[bʊnt], [bʊntə]> and <[bʊnd], [bʊndə]>. Each candidate brings with it a correspondence relation R_{OP} that relates the stem exponents in each paradigm member: [b̲ʊ̲n̲t̲] R_{OP} [b̲ʊ̲n̲d̲ə] and symmetrically [b̲ʊ̲n̲d̲ə] R_{OP} [b̲ʊ̲n̲t̲]. The candidate <[bʊnt], [bʊndə]> incurs two violation marks from the constraint OP-IDENT(voice), one for the violation on the [b̲ʊ̲n̲t̲] R_{OP} [b̲ʊ̲n̲d̲ə] and the other for its symmetric counterpart [b̲ʊ̲n̲d̲ə] R_{OP} [b̲ʊ̲n̲t̲].

According to McCarthy, there are certain predicted consequences devolved from the basic architecture of the OP model. One is overapplication-only. To take <[bʊnt], [bʊntə]> and < [bʊnd], [bʊndə]> as an example, either candidate satisfies OP-IDENT(voice) but the paradigm with underapplication cannot be obtained in the OP model. Overapplication satisfies the high-ranking markedness constraint, in this case devoicing, but underapplication does not. Underapplication does better on IO faithfulness but it loses because the existence of devoicing in the language shows that OP-IDENT(voice) outranks IO faithfulness. [5] Another prediction of OP is attraction to the unmarked. This consequence can be achieved in OP by summing markedness violations of its individual members in a candidate paradigm. The markedness violations incurred in the candidate <A1, B1> are those incurred by A1 or B1. The third prediction of OP is the possibility of majority-rules effects. When we use the term attractor for the paradigm member which other members are forced to resemble, the pattern that is the most common in a paradigm acts as an attractor to other paradigm members.

The tableau for the candidate paradigms of a Classical Arabic verb *stafʕal* in (7) shows the interaction of OP constraints with markedness constraints and IO faithfulness constraints. The constraints employed in (7) are listed in (6).

(6) No-LL: Any sequence of light syllables is prohibited.
   EXH(PrWd): The immediate constituents of the Prosodic Word nodes
              are feet.

No-LL, which is the constraint responsible for syncope, assigns violation mark to any sequence of light syllables. McCarthy (2001) assumes that No-LL detects two (partially overlapping) LL sequences in a CVCVCV string.

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[5] Underapplication is possible only in the cases where some overapplication is blocked by some other constraint (McCarthy 2001: 6).

(7) McCarthy 2001: 31

/stafʕal/	OP-DEP -V	No-LL	EXH (PrWd)	IO-DEP -V
a.☞ <s₀tafʕala, jastafʕilu, …>		**	*	
b. <sitafʕala, jasitafʕilu, …>		***!		**
c. <sitafʕala, jastafʕilu, …>	*!	**		*

In (7), an OP constraint, OP-DEP-V (or OP-MAX-V going the other way) is ranked against one IO faithfulness constraint, IO-DEP-V and two markedness constraints, No-LL and EXH (PrWd). Given the highest rank of OP-DEP-V, an intraparadigmatic *i*/zero alternation makes (7c) the worst candidate. (7a) and (7b) fare equally well with respect to OP-DEP-V and consequently, the highest ranking markedness constraint No-LL determines which candidate will be the winner. Since (7a) has fewer violation marks from No-LL than (7b), (7a) is selected as optimal.

In the following section, I turn to the phenomenon of surface resemblance in Korean nominal inflection and give an analysis couched on the OP model by McCarthy (2001).

4. Analysis

As described in Section 2, it has been reported that there are five different dialects as to the inflection of a noun *pat^h* `field.´ In this section, I first take up the dialects with the paradigms in which the stem-final dental consonant undergoes palatalization in the nominative form, i.e. Dialects A, B, and C, and deal with the rest of the dialects later.

4.1 Dialects A and C

Dialects A and C exhibit relatively simple paradigms. The paradigm of *pat^h* in Dialect A is repeated in (8).

(8) Dialect A
   -i `Nom.´        -ɨl `Acc.´   -e `Loc.´
   pac^hi   pat^hɨl   pat^he

In Dialect A, the dental-palatal alternation exactly conforms to what the traditional description of palatalization predicts; a dental stop /t^h/ is palatalized when it is followed by a high front vowel /i/ but not when it is followed by any other vowel. Thus, the normal application of palatalization is observed and this means that uniformity within the paradigm does not count in this dialect.

(9) lists the constraints used to deal with Dialect A and (10) illustrates the constraint interaction that results in the normal application of

palatalization.

(9) *Ti: A sequence of dental stop and a high front vocoid is prohibited.[6]
　　IO-ID(ant): Corresponding segments between the input and the output
　　　　　　　are identical with respect to the feature [±anterior].
　　OP-ID(ant): Corresponding segments among the paradigm members
　　　　　　　are identical with respect to the feature [±anterior].

*Ti is responsible for palatalization. As it is not of main concern of this paper to analyze palatalization in Korean itself, I simply posit a constraint referred to as *Ti, which prohibits sequences of a dental stop and a high front vocoid.[7] Following Kiparsky (1993), I assume that dental stops /t, tʰ/ are distinguished from palatal stops /c, cʰ/ by anteriority; the former are [+anterior] and the latter are [-anterior]. Hence, enforcement of *Ti necessarily causes the violation of IO-ID(ant).

(10) Dialect A: *Ti » IO-ID(ant) » OP-ID(ant)

/patʰ/	*Ti	IO-ID(ant)	OP-ID(ant)
a. ☞ <pacʰi, patʰɨl, patʰe, …>		*	****
b. < pacʰi, pacʰɨl, patʰe, …>		**!	****
c. <pacʰi, pacʰɨl, pacʰe, …>		**!*	
d. <patʰi, patʰɨl, patʰe, …>	*!		

The candidates include a paradigm where palatalization occurs only before the nominative suffix /-i/, a paradigm where /tʰ/ is palatalized before the nominative suffix and the accusative suffix /-ɨl/, a paradigm where /tʰ/ has been palatalized throughout and a paradigm where /tʰ/ is preserved throughout.[8]

   (10d), where all the paradigm members are faithful to the input stem, is eliminated immediately since it fatally violates the top-ranking *Ti. The constraint which differentiates the remaining three candidates is an IO faithfulness constraint, IO-ID(ant). Since input-output faithfulness constraints evaluate all members of the candidate paradigm, the number of the violation marks from IO-ID(ant) is the sum of those incurred by each paradigm member. This makes it possible to single out (10a), the candidate which has the least violations of IO-ID(ant) among (10a-c), as the optimal paradigm.

   OP-ID(ant) does not play any significant role in evaluating the candidates in (10). It is ranked so low that it cannot exert any influence on

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[6] *Ti applies only to sequences that are formed by morpheme combination.
[7] For an Optimality-theoretic analysis of Korean palatalization, refer to Hong (1997) and Kim (2002).
[8] Another potential candidate <pacʰi, patʰɨl, pacʰe> has been deliberately excluded from the tableau in (10). I will discuss the issue related with it in the next subsection.

selecting the optimal candidate. Nevertheless, it is in order at this juncture to mention how violation marks are computed from an OP constraint. McCarthy (2001) does not give any example of a tableau in which candidate paradigms consist of more than two members. As stated in (5), in OP, the stem in each paradigm member is in a correspondence relation with the stem in every other paradigm member. According to this premise, we can find six correspondence relations in (10a): [pac^{h}i] R_{OP} [pat^{h}ɨl], [pac^{h}i] R_{OP} [pat^{h}e] and [pat^{h}ɨl] R_{OP} [pat^{h}e] and their symmetric counterparts. Among these six correspondence relations, OP-ID(ant) is violated in the first two relations and their symmetric counterparts; hence, the total of four violation marks in (10a). (10b), analogously, receives four violation marks from OP-ID(ant). (10c) and (10d) satisfy the OP constraint since the stem exponents have the identical phonological shape in all the paradigm members.

Next, let us consider Dialect C. Dialect C has the following paradigm for *pat^h*.

(11) Dialect C

| -i `Nom.´ | -ɨl `Acc.´ | -e `Loc.´ |
| pac^{h}i | pac^{h}ɨl | pac^{h}e |

In this dialect, the palatal consonant appears throughout the paradigm although /t^h/ is not placed in the proper environment for palatalization in the accusative and the locative. Thus, the overapplication of palatalization is pervasive in this dialect. The following tableau shows how the paradigm in (11) arises in Dialect C.

(12) Dialect C: *Ti » OP-ID(ant) » IO-ID(ant)

/pat^h/	*Ti	OP-ID(ant)	IO-ID(ant)
a. <pac^{h}i, pat^{h}ɨl, pat^{h}e, …>		*!***	*
b. < pac^{h}i, pac^{h}ɨl, pat^{h}e, …>		*!***	**
c. ☞<pac^{h}i, pac^{h}ɨl, pac^{h}e, …>			***
d. <pat^{h}i, pat^{h}ɨl, pat^{h}e, …>	*!		

The only difference between Dialect A and Dialect C is the relative ranking between the OP constraint and the IO constraint. While the OP constraint is ranked below the IO constraint in Dialect A, the ranking is reversed in Dialect C. Since (12d) violates the high ranking *Ti and (12a) and (12b) violate OP-ID(ant), (12c) becomes the winner. Thus, ranking OP-ID(ant) over IO-ID(ant) results in the overapplication effect. In this dialect, intraparadigmatic uniformity is achieved at the expense of faithfulness to the input.

As demonstrated in (12), it is possible to account for Dialect C by implementing the ranking OP-ID(ant) » IO-ID(ant) on the input /pat^h/ and

candidate paradigms. However, another analysis for Dialect C is available. It is to assume that restructuring has occurred in this dialect, giving rise to /pac^h/ as the input (Song 1998, Choi 1998). The tableau in (13) is based on the restructured input /pac^h/.

(13) Dialect C

/pac^h/	*Ti	IO-ID(ant)	OP-ID (ant)
a. <pac^{h}i, pat^{h}ɨl, pat^{h}e, …>		*!*	****
b. <pac^{h}i, pac^{h}ɨl, pat^{h}e, …>		*!	****
c. ☞<pac^{h}i, pac^{h}ɨl, pac^{h}e, …>			
d. <pat^{h}i, pat^{h}ɨl, pat^{h}e, …>	*!	***	

The paradigm (13c) is selected as optimal because it satisfies all three constraints considered.

4.2 Dialect B

As repeated in the following paradigm, palatalization takes place in the nominative and the accusative, excluding the locative, in the inflectional paradigm of *pat^h* in Dialect B. What is observed is partial overapplication of palatalization.

(14) Dialect B
-i `Nom.´       -ɨl `Acc.´   -e `Loc.´
pac^{h}i   pac^{h}ɨl   pat^{h}e

Attempting to produce the paradigm in (14) with the constraints used to analyze paradigms in Dialects A and C, we are faced with problems. (stands for a candidate which is counterfactually selected as optimal.)

(15) Dialect B

/pat^h/	*Ti	OP-ID(ant)	IO-ID(ant)
a. <pac^{h}i, pat^{h}ɨl, pat^{h}e, …>		*!***	*
b. < pac^{h}i, pac^{h}ɨl, pat^{h}e, …>		*!***	**
c. <pac^{h}i, pat^{h}ɨl, pac^{h}e, …>		*!***	**
d. ☜ <pac^{h}i, pac^{h}ɨl, pac^{h}e, …>			***
e. <pat^{h}i, pat^{h}ɨl, pat^{h}e, …>	*!		

The constraints in (15) wrongly selects (15d), the actual paradigm for Dialect C, as the optimal paradigm for Dialect B.

Ranking those constraints differently does not improve the situation.

(16) Dialect B

/patʰ/	*Ti	IO-ID(ant)	OP-ID(ant)
a. ☞ <pacʰi, patʰɨl, patʰe, …>		*	****
b. < pacʰi, pacʰɨl, patʰe, …>		**!	****
c. <pacʰi, patʰɨl, pacʰe, …>		**!	****
d. <pacʰi, pacʰɨl, pacʰe, …>		**!*	
e. <patʰi, patʰɨl, patʰe, …>	*!		

Reversing the ranking of the IO constraint and the OP constraint results in the paradigm (16a), the paradigm for Dialect A, as the optimal paradigm. A more serious problem is that given the constraints used above, candidates (16b) and (16c) cannot be distinguished; the result of the evaluation will always be identical in (16b) and (16c) no matter how the constraints are ranked. This means that we cannot obtain the desired paradigm for Dialect B with the constraints given so far.

In order to handle the paradigm of Dialect B, I propose that an OP constraint be subdivided according to which pairs of the paradigm members are in a correspondence relation. In consequence, those sub-OP-constraints can be ranked independently. This complies with the OP premises since in OP, every member of a paradigm is compared with every other member in their surface resemblance. For example, the correspondence relation between the nominative form and the accusative form can be separated from the correspondence relation between the nominative form and the locative form or that between the accusative form and the locative form. Those three sorts of correspondence relation, which I will refer to as OP$_{N-A}$, OP$_{N-L}$ and OP$_{A-L}$ respectively, can be ranked separately. Using these newly proposed subconstraints, the paradigm for Dialect B is as exhibited in (17).

(17) Dialect B
     *Ti » OP-ID(ant)$_{N-A}$ » IO-ID(ant) » OP-ID(ant)$_{N-L}$, OP-ID(ant)$_{A-L}$

/patʰ/	*Ti	OP-ID (ant)$_{N-A}$	IO-ID (ant)	OP-ID (ant)$_{N-L}$	OP-ID (ant)$_{A-L}$
a. <pacʰi, patʰɨl, patʰe, …>		*!*	*	**	
b. ☞ < pacʰi, pacʰɨl, patʰe, …>			**	**	**
c. <pacʰi, patʰɨl, pacʰe, …>		*!*	**		**
d. <pacʰi, pacʰɨl, pacʰe, …>			***!		
e. <patʰi, patʰɨl, patʰe, …>	*!				

As OP-ID(ant)$_{N-A}$, OP-ID(ant)$_{N-L}$ and OP-ID(ant)$_{A-L}$ are independent, each of them can be ranked against the others and also against markedness

constraints or IO faithfulness constraints. In (17), two violation marks are incurred from each OP-ID(ant) constraint because each OP-ID(ant) constraint in fact covers two OP-ID(ant) correspondence relations – one correspondence relation and its symmetric counterpart. For instance, OP-ID(ant)$_{N-A}$ abbreviates two OP correspondence relations, Nom. R_{OP} Acc. and Acc. R_{OP} Nom. In Dialect B, having IO-ID(ant) ranked between OP-ID(ant)$_{N-A}$ and the other OP-ID(ant) constraints makes it possible for (17b) to be selected as the optimal paradigm. (17b) fares better than (17a) or (17c) because it satisfies OP-ID(ant)$_{N-A}$. (17b) ties with (17d) with respect to OP-ID(ant)$_{N-A}$ but IO-ID(ant) settles the competition because (17b) incurs fewer violation marks from IO-ID(ant) than (17d). (17e) is the worst candidate since it violates the undominated constraint that prohibits the sequence of a dental stop and a high front vowel.

In the constraint ranking for Dialect B, OP-ID(ant)$_{N-A}$ outranks OP-ID(ant)$_{N-L}$ and OP-ID(ant)$_{A-L.}$ This means that the resemblance between the nominative form and the locative form or between the accusative form and the locative form implies the resemblance between the nominative form and the accusative form. Thus, the unity between the nominative form and the accusative form is stronger than that between any other paradigm members. This property is in accord with our expectations when the syntactic behaviors of nominal suffixes were taken into consideration. As syntactic (or structural) cases, nominative and accusative cases fulfill the most productive grammatical functions. There are several properties shared by the structural cases; the suffixes for these cases (/-ka/ or /-i/ for nominative case and /-ɨl/ or /-lɨl/ for accusative case) can be omitted in colloquial speech and also these suffixes cannot cooccur with a delimiter denoting topicality (Sohn 1999).[9]

Now, with the proposal that OP constraints can be decomposed into subconstraints depending on the pairs compared, it is necessary to evaluate the paradigms of Dialect A and Dialect C using the newly proposed subconstraints.

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[9] According to Sohn (1999), not only nominative and accusative cases but genitive case (/-ɨy/ or /-ɨi/) is also a structural case in Korean. However, I will not discuss paradigm uniformity involving genitive case in this paper since no data regarding genitive case is available. The vowel /ɨy/ is currently so unstable that it is often pronounced as one of /i/, /e/ and /ɨ/ depending on the context.

(18) Dialect A

      *Ti » IO-ID(ant) » OP-ID(ant)$_{N-A}$, OP-ID(ant)$_{N-L}$, OP-ID(ant)$_{A-L}$

/patʰ/	*Ti	IO-ID (ant)	OP-ID (ant)$_{N-A}$	OP-ID (ant)$_{N-L}$	OP-ID (ant)$_{A-L}$
a. ☞ <pacʰi, patʰɨl, patʰe, …>		*	**	**	
b. <pacʰi, pacʰɨl, pacʰe, …>		**!		**	**
c. <pacʰi, patʰɨl, pacʰe, …>		**!	**		**
d. <pacʰi, pacʰɨl, pacʰe, …>		**!*			
e. <patʰi, patʰɨl, patʰe, …>	*!				

The tableau in (18) is consistent with that in (10); the lowest ranking OP constraints are integrated in (10) but they are separated and unranked in (18). The two constraint rankings yield the identical output.

   The same situation holds for Dialect C.

(19) Dialect C

      *Ti » OP-ID(ant)$_{N-A}$, OP-ID(ant)$_{N-L}$, OP-ID(ant)$_{A-L}$ » IO-ID(ant)

/patʰ/	*Ti	OP-ID (ant)$_{N-A}$	OP-ID (ant)$_{N-L}$	OP-ID (ant)$_{A-L}$	IO-ID (ant)
a. <pacʰi, patʰɨl, patʰe, …>		*!*	**		*
b. <pacʰi, pacʰɨl, patʰe, …>			*!*	**	**
c. <pacʰi, patʰɨl, pacʰe, …>		*!*		**	**
d. ☞ <pacʰi, pacʰɨl, pacʰe, …>					***
e. <patʰi, patʰɨl, patʰe, …>	*!				

The tableau in (19) is consistent with that in (12). The OP-ID(ant) constraint in (12), which is ranked between *Ti and IO-ID(ant) as one integrated constraint, is subdivided yet unranked in (19). The same paradigm will be produced without any problem with the restructured input /pacʰ/. Thus, decomposing OP-ID(ant) into subconstraints can deal with Dialects A and C as well as Dialect B.

   It is clear from the discussion so far that one of the predictions from the OP model is borne out in Korean nominal inflection. As McCarthy (2001) argues, only overapplication is found in the paradigms. The paradigm with underapplication <patʰi, patʰɨl, patʰe, …> is perfect with respect to OP-ID(ant) and IO-ID(ant), but it cannot win because it fatally violates the high ranking markedness constraint *Ti. The existence of palatalization in Korean makes the markedness constraint outrank the relevant IO faithfulness constraint.

4.3 Paradigm uniformity or palatalization?

In this section, I will examine a potential alternative analysis for Dialect B, which does not deal with it in terms of paradigm leveling but resorts to a modified version of palatalization.

The analysis presented in the preceding section attributes the surface resemblance between the nominative form and the accusative form in Dialect B to the correspondence relation between paradigm members. However, it is also possible to examine the same phenomenon from a different viewpoint. Let us suppose that in Dialect B, the environment of palatalization, which has been traditionally described as high front vocoids, is extended to include /ɨ/. This appears to be a reasonable hypothesis because /ɨ/ is another phonetically plausible context for palatalization (Lahiri and Avers 1991). Thus, in this case, the environment has been changed from high front unround vocoids /i, y/ to high unround vocoids /i, y, ɨ/.

Under this approach, there is no overapplication of palatalization in Dialect B; rather, palatalization applies normally as predicted by its description. When the constraint *T[+high, -round] is responsible for the dental/palatal alternation in this dialect, the ranking in the following tableau successfully selects the correct paradigm without subdividing the OP constraint.

(20) Dialect B: *T[+high, -round] » IO-ID(ant) » OP-ID(ant)

/patʰ/	*T[+high, -round]	IO-ID(ant)	OP-ID(ant)
a. <pacʰi, patʰɨl, patʰe, …>	*!	*	****
b. ☞ < pacʰi, pacʰɨl, patʰe, …>		**	****
c. <pacʰi, patʰɨl, pacʰe, …>	*!	**	****
d. <pacʰi, pacʰɨl, pacʰe, …>		***!	
e. <patʰi, patʰɨl, patʰe, …>	*!*		

(20a) and (20c) are assigned one violation mark for not palatalizing /tʰ/ before the vowel /ɨ/ and (20e) are given two violation marks because /tʰ/ is not palatalized before /i/ and /ɨ/. Since *T[+high, -round] is the top ranking constraint, these candidates are eliminated from further evaluation. (20b) is ultimately chosen as the optimal paradigm because it is more faithful to the anteriority of the input than (20d).

However, there is a piece of evidence that goes against this alternative account. As exemplified in (21), even speakers of Dialect B never palatalize a dental stop in the stem-final position of a verb when it is followed by /ɨ/.

(21) Verb inflection in Dialect B
    tat + ɨn   [tadɨn] (*[tajɨn])   `to close + modifier′
    mit + ɨn   [midɨn] (*[mijɨn])   `to believe + modifier´
    kat^h + ɨn   [kat^{h}ɨn] (*[kac^{h}ɨn])   `to be identical + modifier′

If the resemblance between the nominative form [pac^{h}i] and the accusative form [pac^{h}ɨl] in Dialect B is due to the extension of the palatalizing environment, a dental stop in the verb stem-final position must also be palatalized before a suffix that begins with /ɨ/, but contrary to this prediction, it fails to undergo palatalization.

   Given this fact, I argue that the resemblance between [pac^{h}i] and [pac^{h}ɨl] in Dialect B cannot be handled by an expanded version of palatalization but must be accounted for in terms of paradigm uniformity.

4.4 Dialects D and E

This section will discuss the paradigms found in Dialects D and E. They form a group separate from Dialects A, B and C as they do not involve palatalization. First, the paradigm of Dialect D is given in (22).[10]

(22) Dialect D
    -i `Nom.´    -ɨl `Acc.´   -e `Loc.´
    pasi   pasɨl   pat^{h}e

In the paradigm in (22), /s/ appears in the stem-final position before the nominative and the accusative suffix while /t^h/ is retained before the locative suffix.

   How to characterize the /t^h/-/s/ alternation as shown in (22) is still a matter of controversy among phonologists. This phenomenon is not limited to /t^h/ but other dental and palatal obstruents can be neutralized to /s/ in the stem-final position of a noun when the following suffix begins with a vowel (Ahn 1985, Kim-Renaud 1986, Oh 1994, Kim 1998, Kim 2001).[11]

(23) mit^h + i   [misi]/[mic^{h}i]   `bottom + Nominative′
    mit^h + ɨl [misɨl]/[mit^{h}ɨl]   `bottom + Accusative′
    cəc +i   [cəsi]/[cəji]   `milk + Nominative′
    cəc + ɨl   [cəsɨl]/[cəjɨl]   `milk + Accusative′
    pic^h + i   [pisi]/[pic^{h}i]   `light + Nominative′
    pic^h + ɨl [pisɨl]/[pic^{h}ɨl]   `light + Accusative′

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[10]   All dental consonants in Korean undergo allophonic palatalization. Hence, *s* before *i* in the examples must be [ʃ] in the narrow transcription but I will not include the effect of allophonic palatalization in the examples.

[11]   Among the coronal obstruents /t, t^h, t', s, s', c, c^h c'/, this phenomenon mainly applies to /t^h, s, c, c^h/ because there is no noun stem that ends with a tense consonant and also nouns that end with /t/ are extremely rare.

When the coronal obstruents are placed before a suffix that begins with a consonant, they are neutralized to /t/ through coda neutralization.

(24) mitʰ + kwa   [mitk'wa]   `bottom + and′
     cəc + to   [cətt'o]   `milk + also′
     picʰ + p'un   [pitp'un]   `light + only′

   As shown in (25), this coronal-/s/ alternation does not apply to the coronal consonants of the verb stem-final position.

(25) kət+ɨn   [kədɨn]   (*[kəsɨn])   `to collect + modifier′
     cʰac+a   [cʰaja]   (*[cʰasa])   `to find + continuative′
     c'ocʰ+a   [c'ocʰa]   (*[c'osa])   `to chase + continuative′

   (26) is Ahn's (1985) characterization of /s/-neutralization.

(26) Unreleased Obstruent Neutralization (UON): Optional[12]
     (Ahn 1985: 172)

     [+obst, +cor] → s   / ____]ₙ V   (domain: stratum 4)

Oh (1994), and Kim (1998) characterize it as continuant assimilation as in (27).

(27) /s/-neutralization (Kim 1998: 98)

        [-son, + cor]
              |
           C}ₚw V
             \ /
           [+cont]
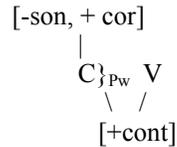
   As it is beyond the scope of this paper to explore the exact characterization of this phenomenon, I will simply refer to the constraint that brings about this effect as `/s/-neutralization′ and assume that the change in continuancy is responsible for the alternation.[13]

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[12]   According to Ahn (1985), inflection and case marking take place in stratum 4 in the Korean lexicon.
[13]   Kim (2001) argues that /s/-neutralization is a process of frication by which the feature [+strident] is inserted with the loss of the feature [-continuant]. In her view, the /tʰ/-/s/ alternation may also be attributed to the change in stridency.

(28) IO-ID(cont): Corresponding segments between the input and the
output are identical with respect to the feature
[±continant].
OP-ID(cont): Corresponding segments among the paradigm members
are identical with respect to [±continant].

(29) Dialect D: *Ti » OP-ID(cont)$_{N-A}$ » IO-ID(ant) » IO-ID(cont)
» /s/-Neut » OP-ID(cont)$_{N-L}$, OP-ID(cont)$_{A-L}$

/pat^h/	*Ti	OP-ID (cont)$_{N-A}$	IO-ID (ant)	IO-ID (cont)	/s/- Neut	OP-ID (cont)$_{N-L}$	OP-ID (cont)$_{A-L}$
a. <pasi, pat^{h}ɨl, pat^{h}e, …>		*!*		*	**	**	
b.☞<pasi, pasɨl, pat^{h}e, …>				**	*	**	**
c. <pasi, pat^{h}ɨl, pase, …>		*!*		**	*		**
d. <pasi, pasɨl, pase, …>				***!			
e. <pat^{h}i, pasɨl, pase, …>	*!	**		**	*	**	
f. <pac^{h}i, pac^{h}ɨl, pac^{h}e, …>			*!**		***		
g. <pac^{h}i, pac^{h}ɨl, pat^{h}e, …>			*!*		***		

(29e) is eliminated because of its fatal violation of *Ti. (29a) and (29c) are
out because continuancy of the nominative form does not agree with that
of the accusative form. (29f) and (29g), which include members with a
palatal stop, satisfy IO-ID(cont) but they lose out because they are not
faithful to the input in their anteriority.

   Dialect D is in a close parallel to Dialect B in that phonological
resemblance is found only between the nominative form and the accusative
form. As in Dialect B, there would be no way for the paradigm <pasi, pasɨl,
pat^{h}e, …> to be selected as optimal if a unitary OP-ID(cont) constraint is
maintained. A single OP-ID(cont) cannot distinguish it from the paradigm
<pasi, pat^{h}ɨl, pase, …>. By separating OP-ID(cont)$_{N-A}$ from other OP-
ID(cont) constraints and ranking it over IO-ID(cont), the desired outcome
can be produced.

   Dialect B and Dialect D show that resemblance can be enforced only
within a subset of the paradigm members whether the phenomenon
involved is palatalization or /s/-neutralization. Thus, Dialect D supports the
proposal made to account for Dialect B that an OP-ID constraint can be
decomposed into subconstraints depending on which two paradigm
members stand in correspondence relation and also the ranking for the

Korean nominal inflection is OP-ID$_{N-A}$ » OP-ID$_{N-L}$, OP-ID$_{A-L}$. Furthermore, Dialect D adds support to the approach discussed in Section 4.3 that the resemblance between [pac^{h}i] and [pac^{h}ɨl] in Dialect B is attributed to paradigm leveling rather than modification of the environment of palatalization. It is generally believed that the condition for /s/-neutralization is before any vowel and /s/-neutralization does not depend on the featural make-up of the following vowel.[14]

Finally, let us consider the paradigm of Dialect E.

(30) Dialect E
    -i `Nom.´    -ɨl `Acc.´ -e `Loc.´
    pasi   pasɨl   pase

In Dialect E, /s/-neutralization occurs throughout the paradigm. Given the constraints employed for Dialect D, the ranking in (31) yields the desired paradigm for Dialect E.

(31) Dialect E: *Ti » /s/-Neut, OP-ID(cont)$_{N-A}$, OP-ID(cont)$_{N-L}$,
         OP-ID(cont)$_{A-L}$ » IO-ID(cont)

/pat^h/	*Ti	/s/-Neut	OP-ID (cont) N-A	OP-ID (cont) N-L	OP-ID (cont) A-L	IO-ID (cont)
a.☞ <pasi, pasɨl, pase, …>						***
b. <pasi, pasɨl, pat^{h}e, …>		*!		**	**	**
c. <pasi, pat^{h}ɨl, pase, …>		*!	**		**	**
d. <pat^{h}i, pasɨl, pase, …>	*!	*	**	**		**
e. <pat^{h}i, pat^{h}ɨl, pat^{h}e, …>	*!	***				
f. <pac^{h}i, pac^{h}ɨl, pac^{h}e, …>		*!**				
g. <pac^{h}i, pac^{h}ɨl, pase, …>		*!*		**	**	*

Unlike Dialect D, IO-ID(cont) is demoted and ranked lowest in the constraint ranking for Dialect E. Therefore, (31a), in which /s/ appears in every member of the paradigm, is selected as the winning candidate.

As in the case of Dialect C, it is also possible to posit the restructured /pas/ as the input for Dialect E (Kim-Renaud 1986, Choi 1998). (32) shows

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[14] Unlike others, Kim (2001) argues that the stem-final /t^h/ remains unchanged before non-high vowels.

how the paradigm with the palatal stop throughout is selected for Dialect E when the input is /pas/.

(32) Dialect E: *Ti » /s/-Neut, OP-ID(cont)$_{N-A}$, OP-ID(cont)$_{N-L}$,
OP-ID(cont)$_{A-L}$ » IO-ID(cont)

/pas/	*Ti	/s/-Neut	OP-ID (cont)$_{N-A}$	OP-ID (cont)$_{N-L}$	OP-ID (cont)$_{A-L}$	IO-ID (cont)
a.☞ \<pasi, pas$\frac{1}{2}$l, pase, …>						
b. \<pasi, pas$\frac{1}{2}$l, pat^{h}e, …>		*!		**	**	*
c. \<pasi, pat^h$\frac{1}{2}$l, pase, …>		*!	**		**	*
d. \<pat^{h}i, pas$\frac{1}{2}$l, pase, …>	*!	*	**	**		*
e. \<pat^{h}i, pat^h$\frac{1}{2}$l, pat^{h}e, …>	*!	***				***
f. \<pac^{h}i, pac^h$\frac{1}{2}$l, pac^{h}e, …>		*!**				***
g. \<pac^{h}i, pac^h$\frac{1}{2}$l, pase, …>		*!*		**	**	**

The stems in the paradigm members in (32a) are faithful to the input and to one another and furthermore, they do not violate markedness constraints. That is, the paradigm in (32a) incurs no violation marks. Hence, it is selected as the optimal paradigm of all.

5. Conclusion

In this paper, I have discussed surface resemblances among paradigm members in Korean nominal inflection within the Optimal Paradigms theory proposed by McCarthy (2001). The discussion has started by examining the patterns of surface resemblance in five different dialects reported by Choi (1998). Choi's (1998) data focuses on what form is produced when the nominative, the accusative, and the locative suffixes are attached to the noun *pat^h* `field.´

Three of the five dialects show the dental/palatal alternation. In one of the three dialects, the dental and palatal consonants are distributed according to what the traditional description of palatalization predicts and hence, normal application. On the other hand, palatalization overapplies in the other dialects. The case of normal application or the case of overapplication through the entire paradigm can be handled without much complication. Yet, the paradigm in which overapplication occurs only within a subset of the members, i.e. the paradigm in which resemblance

appears only between the nominative form and the accusative form, requires a special treatment.

In order to deal with this type of paradigm, I have proposed that the OP-ID(ant) constraint be decomposed into subconstraints such as OP-ID(ant)$_{N-A}$, OP-ID(ant)$_{N-L}$, or OP-ID(ant)$_{A-L}$ according to the correspondence relation among the paradigm members and that these subconstraints be ranked independently. Based on the new proposal, the paradigm with partial overapplication can be accounted for by ranking OP-ID(ant)$_{N-A}$ over IO-ID(ant). A potential alternative account which resorts to an expanded version of palatalization has been examined but rejected because it makes an incorrect prediction.

The analysis proposed for the dialects involving palatalization can be supported by the two other dialects in which /t^h/ alternates with /s/. Each of these two dialects displays an intraparadigmatic resemblance exactly parallel to one of the dialects mentioned above and can be treated analogously by ranking sub-OP-constraints with IO faithfulness constraints. Since the relevant feature responsible for the alternation is continuancy rather than anteriority in these dialects, how to rank IO-ID(cont) against the OP-ID(cont) family crucially determines the type of the paradigm.

In conclusion, the proposal presented in this paper makes it possible to account for both the overapplication of palatalization and for dialectal variation in Korean nominal inflection in a principled way.

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