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SOMMAIRE

Gradual limitation within Harmonic Serialism

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Abstract

This paper aimed at testing McCarthy's proposal of deletion within the framework of Harmonic Serialism (HS) (2018). According to him, the place feature of a target consonant is first delinked to a glottal and then the rest of the features are totally lost. However, the gradual operations of the t-deletion, for example, are not logical due to the distance in place of articulation between the target alveolar and the default glottal in the first HS step. In addition, since the glottal sound is a back sound, it needs a lot of effort from the muscles to produce it. Therefore, reducing an alveolar segment to a glottal becomes heavier than the alveolar sound itself. In investigating the Taizi Yemeni Arabic glottal deletion as in /madrasah/ (مدرسة), 'school', which becomes [madrasa] or [madrasa:], the **phoneme** /h/ meets a single step as it is regarded as a placeless segment. The assumption of featural reduction of place and then total deletion fails to improve gradual harmony and, therefore, cannot be modeled in a harmonic improvement tableau. This is a contradictory logic and goes against the HS gradualness system of deletion, in which deletion is a two-step process. As a consequence, it is suggested to deal with deletion as a one-step process rather than a two-step process.

***Keywords*:** Deletion, Optimality Theory, Harmonic Serialism.

[1] This study was conducted under the supervision of Prof. Chokri Smaoui. Special thanks go to him for the valuable additions he has made to this article.

Introduction

Harmonic Serialism (HS) is a derivational version of standard Parallel Optimality Theory (P-OT), which offers an explanation for intermediate levels (McCarthy, 2000, 2010, 2016, 2018; Prince & Smolensky, 1993/2004). Although it was first proposed in OT's *locus classicus* by Prince and Smolensky (1993/2004), it was not received much attention as a medium of analysis (McCarthy, 2010, 2016). However, it has been revisited in McCarthy's works (2000, 2002, 2006, 2007, 2010, 2016, 2018), resulting in identifying some general implications. Except *Parallelism*, it shares the same system as P-OT: a) the universal components (*GEN, EVAL and CON),* b) the constraints families, and c) the main principles (*universality, violability, ranking, inclusiveness* and *parallelism).* But how is it different from P-OT?

Three main arguments for HS over P-OT are presented by McCarthy (2000, 2016, 2018) in what follows:

- Unlike P-OT, HS offers an explanation for the existence of intermediate derivational steps, which leads to gradualness as a crucial property of GEN.
- Unlike P-OT's GEN, which can apply one or more operations to generate a set of competing candidates at once, GEN in HS, which requires gradualness, can apply one operation to generate a candidate only at one stage.
- Unlike P-OT, GEN-EVAL loop is the mechanism of HS. "In HS, the optimal candidate chosen by EVAL becomes a new input to GEN, which forms a candidate set that goes to EVAL, and so on. The loop continues until EVAL picks an optimum that is identical with the most recent input to GEN" (McCarthy, 2016, p. 2).

Thus, GEN in HS is distinguished mainly by gradualness. Each feature change, deletion, epenthesis, and so on is produced by a single unfaithful operation at a time and, consequently, needs a separate derivational step (McCarthy, 2007). For understanding the mechanism of gradualness within HS, the deletion phenomenon is taken as an example for discussion.

What is deletion?

Deletion is a natural phenomenon that refers to the absence of a segment or more unconsciously. It takes place in order to avoid heaviness of articulation (Sibawayh (cited in Carter), 2016; Gimson (cited in Cruttenden, 2001); Crystal, 2008; Hamouda, 1998; Sibawayh (cited in Haroon), 1988; Ibrahim, 1984). Within OT models, this phenomenon has been addressed differently. It is dealt with as a one-step process within P-OT but as a two-step process within HS.

Deletion as a two-step process

McCarthy (2018) proposed an analysis of deletion within the framework of HS. Starting with a simplified feature geometry in which consonants are headed by their Place node (Clements, 1985; McCarthy, 2018), "GEN provides an operation that can delete any node, including the Root node, but it cannot delete a headed (i.e., Place-bearing) Root node" (McCarthy, 2018, p. 3). This claim means that a segment with a place specification cannot be deleted at once. Consequently, there are two operations:

- delinking the place node.
- deleting the placeless segment and its skeletal slot (a segment without a place node).

According to this GEN assumption, target consonant loss occurs gradually rather than directly. It loses its features through successive derivational steps. For example, the deletion of /t/ in /patka/ can be illustrated within the framework of Feature Geometry, as illustrated in Figure 1:

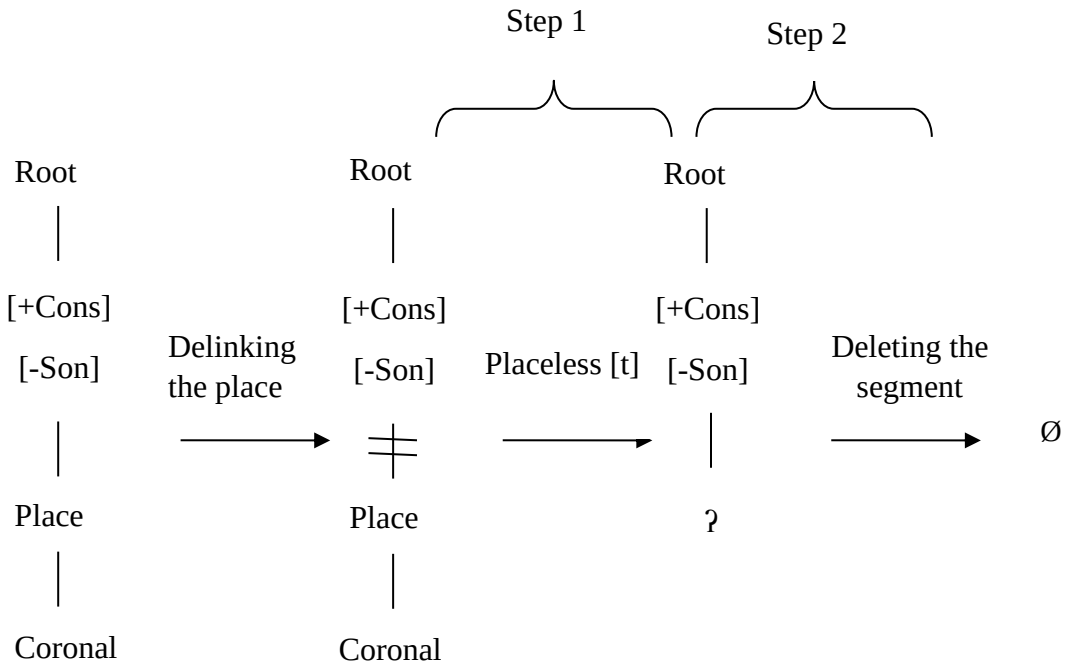

Figure1: A diagram of the serial steps of /t/ deletion

Figure1 depicts the two operations that /t/ goes through: *delinking* and *deleting*. Delinking refers to the process of removing the place node from its tree, whereas deleting stands for dropping the rest of the tree. By delinking the coronal place, /t/ becomes placeless and, a default place (a glottal stop) is given to fill the vacant place. As a result, /t/ in /patka/ is deleted through two steps shown in 1):

1) /patka/ → [paʔ.ka] → [pa.ka].

Similarly, /k/ in /patka/ is deleted by subjecting it to two derivational steps, as demonstrated in 2):

2) /patka/→ [pat.ʔa] → [pa.ta].

These kinds of derivations identify deletion as a two-step process. Within HS, each operation in each step is governed by constraint ranking. The suggested constraints used for explaining the two-step process of deletion are as in 3), 4), 5), and 6):

3) CODA-COND:

> "Assign one violation mark for every token of Place that is not associated with a segment in the syllable onset" (McCarthy, 2008, p. 279).

4) MAX (PLACE):

It prohibits the deletion of place feature (McCarthy & Prince, 1995).

5) HAVE-PLACE:

"Assign one violation mark for every segment that has no Place specification" (McCarthy, 2008, p. 279).

6) MAX (ROOT):

It prohibits the deletion in a root (McCarthy & Prince, 1995).

Tableau 1: Step 1 of /patka/ → [paʔ.ka] → [pa.ka] in HS

/patka/	CODA-COND	HALF-PLACE	MAX(PLACE)	MAX(ROOT)
a. → paʔ.ka		*	*	
b. pat.ʔa	*!	*	*	
c. pat.ka	*!			

HS step 1 in Tableau 1 shows a featural deletion of place in which the alveolar /t/ is reduced to glottal [ʔ], resulting in ranking 7):

7) CODA-COND >> HAVEPLACE & MAX(PLACE)

Ranking 7) says that since CODA-COND dominates both HAVEPLACE and MAX(PLACE), the place node of the coda consonant gets delinked and becomes placeless. Then, the optimal candidate of the first step is fed into GEN for step 2.

Tableau 2: Step 2 of /paʔ.ka / → [paʔ.ka] → [pa.ka] in HS

paʔ.ka	CODA-COND	HALF-PLACE	MAX(PLACE)	MAX(ROOT)
a. → pa.ka				*
b. paʔ.ka		*!		

In Tableau 2, HS step 2 exposes the total deletion of the segment /t/. Again, its optimal candidate serves as an input to HS step 3.

Tableau 3: Step 3 of /patka/ → [paʔ.ka] → [pa.ka] in HS

[pa.ka]	CODA-COND	HALF-PLACE	MAX(PLACE)	MAX(ROOT)	
c. → pa.ka					*convergence*
d. Pa.ʔa		*!	*!		

In Tableau 3, HS step 3 shows that since the optimal candidate [pa.ka] does not differ from the most recent input [pa.ka], converges takes place. Therefore, the final optimal candidate is the output [pa.ka].

Arguments against Deletion as a two-step process

The argument against deletion as a two-step process is initiated by investigating the nature of the gradualness of /t/ deletion as in /patka/. The place feature of /t/ is delinked, resulting in [paʔ.ka] and then the placeless segment is lost totally, producing [pa.ka]. However, this featural reduction in the first HS step seems to be not logical for some reasons. The transition from the alveolar /t/ to the default [ʔ] reveals nonsensical mapping. This rejection is attributed to the fact that the point of articulation of the alveolar /t/ in the input is very far in the mouth from the point of articulation of the generated [ʔ] in the output. In addition, reducing the alveolar /t/ to the glottal [ʔ] becomes heavier than the alveolar sound itself. Since the glottal sound is a back one, it needs a lot of effort from the muscles to produce it. Due to the distance and heaviness, it is assumed that there is impossibility of the featural reduction of the alveolar /t/ to be shifted or mapped. Therefore, HS analysis of deletion may not be possible at this stage. Accordingly, deletion of features can be considered as a property of an entire segment without any need for giving sup-operations or steps to reach the surface structure. As a result, a segment deletion can be identified as a one-step process:

8) /t/ → Ø

Since it is sufficient to account for a segment deletion as one property, it relies on *CODA (McCarthy & Prince, 1993; Prince & Smolensky, 1993/2004), which is able to adequately model the attested deletion typology.

The argument against deletion as a two-step process is supported by presenting data from Taizi Yemeni Arabic (TYA), with the emphasis on the glottal sounds within the HS framework. Consider the following paradigm 9):

9) Glottal deletion

a. the deletion of the phoneme /ʔ/

/sama:ʔ/	[sama:]	سماء	sky
/ma:ʔ/	[ma:]	ماء	water
/dawa:ʔ/	[dawa:]	دواء	medicine

b. the deletion of the morpheme /h/

/madrasah/	[madrasa] or [madrasa:]	مدرسة	school
/ħadi:qah/	[ħadi:qa] or [ħadi:qa:]	حديقة	park
/ʔusta:ða/	[ʔusta:ða] or [ʔusta:ða:]	أستاذة	teacher (female)

The data in 9) shows the total deletion of the phonemic /ʔ/ and the morphemic [h] at casual level. Unlike McCarthy's proposal, in which deletion is a two-step process and the glottal [ʔ] is dealt with as an allophone, evidence shows that each of the phonemic glottal /ʔ/ and the morphemic glottal [h] meets deletion in a single step. Differently, the assumption of featural reduction of place and then total deletion fails to improve harmony in the case of Arabic phonemic and morphemic glottal deletion. It does not show any gradual sense or harmonic improvement of features and, hence, cannot be modeled in a harmonic improvement tableau.

This is a contradictory logic and goes against the HS gradualness system of deletion, which says that deletion is a two-step process.

Deletion as a one-step process

Given that the HS featural reduction of place is not true, a segment deletion is identified as a one-step process and motivated by the markedness constraint *CODA at the expense of the faithfulness constraint $MAX_{segment.}$ Accordingly, the examples in 1) and in 9) are suggested to be analyzed as illustrated in Tableau 4 and 5:

Tableau4: deletion of /patka/ as a one-step process.

Patka	*CODA	$MAX_{/t/}$
a. → Pa.ka		*
b. Patka	*!	

Tableau 5: deletion of /sama:ʔ/ as a one-step process

/sama:ʔ/	*CODA	$MAX_{/ʔ/}$
a. → sa. ma:		*
b. sa. ma:ʔ	*!	

According to Tableaux 4 and 5, deletion is not an operational term. It is a one-step process. It takes place by satisfying the markedness constraint *CODA and violating the faithfulness $MAX_{segment.}$

Conclusion

This paper aimed at testing McCarthy's proposal of deletion within the HS framework (2018), in which the output loops back into GEN for another pass. The HS surface structure cannot be obtained by applying a single step. Deletion is dealt with as an operational term, defined as a two-step process and accounted for by CODA-COND, HALF-PLACE, MAX(PLACE) and MAX(ROOT) in gradual steps. However, findings showed that this HS analysis suffers from some serious drawbacks, attributed to the distance of articulation place, effort of muscles, not applicable to all segments and loss of harmonic improvement.

Accordingly, deletion is regarded as a one-step process rather than a two-step process, and can be accounted for by *CODA and MAX/t/.

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