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Schwa in MA After Morphological Operations: Against A Transderivational Account

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Abstract

In this paper, I present an alternative account of the placement of schwa in Moroccan Arabic after morphological operations. This vowel, considered epenthetic by many scholars, moves position when certain morphological processes are applied. For example, in a word like 'ktəb' meaning 'write', schwa is inserted between C2 and C3. If the –u morpheme meaning 'they' is added, we get the following form: 'kətbu'. Schwa moves to the position between C1 and C2. Boudlal (2001) analysed this from a transderivational perspective. As far as the present account is concerned, this analysis is too complicated. Hence, I provide an analysis using tools provided by Optimality Theory to overcome the weaknesses of Boudlal's analysis. It was found that a constraint active in the language which bans the occurrence of schwa open syllables, in combination with other constraints, is responsible for the placement of schwa. Such an analysis is simpler and accounts more elegantly for the placement of schwa resulting from morphological operations.

1- Introduction

The distribution of schwa in Moroccan Arabic after morphological operations was analysed by Boudlal (2001) from a transderivational standpoint. That is, the position of schwa is the effect of output/output correspondence as advanced in McCarthy and Prince (1995). More specifically, the position of schwa in an output-output account is governed by the affixation to the stem or affixation to the word as claimed by Boudlal(ibid). In other terms, schwa changes position in an output according to what the affixation is targeting: the word or the stem. If it is suffixation to the word, schwa takes a specific position, but it changes its position once suffixation is to the word. According to the analysis that will be presented in this study, this analysis is beset with some shortcomings. For instance, it is hard to generalize it to a large body of outputs, ie, it yields many ungrammatical outputs. More than that, it is too complicated for accounting for a simple process as schwa distribution in Moroccan Arabic.

This study aims to present a much generalized account to this phonologically-driven morphological variation. As a matter of fact, the variation in the position of schwa is the result of the combination of some constraints a la OT active in Moroccan Arabic and which effect is the various positions schwa occupies. To put it in more specific terms, a constraint that is active in the language and which bans schwa open syllables in combination with other constraints is responsible for the distribution of schwa. Accordingly, the study's aim is to answer the following research questions: What governs the distribution of schwa after morphological operations? Is the account presented in Boudlal (2001) of a generalised nature? What constraints a la OT govern the distribution of schwa in Moroccan Arabic?

The analysis is carried within the framework of Optimality theory as advanced in McCarthy and Prince (1995) and Prince and Smolensky (1993) and subsequent works. Principles

advanced by the theory of faithfulness as a premise of OT and its later development, namely the theory of correspondence is called for to account for the placement of schwa after morphological operations.

The data I will focus on is from Average Moroccan Arabic as advanced in works such as Harrell (1962), Benhallam (1980,1990) Abdelmassih (1973), Boudlal (2001) and other scholars

2- Theoretical framework

2-1- Optimality Theory

Optimality Theory is a constraint-based approach that was advanced by McCarthy and Prince (1993), Prince and Smolensky (1993), McCarthy and Prince (1995) and others. For advocates of this theory, Grammar of any human language is made up of constraints that act as well-formedness and faithfulness constraints in a parallel fashion to yield outputs. For instance, for this theory there are no rules or repair strategies that act on outputs to repair any exceptions resulting after the application of these rules. Grammar for OT is constituted of a Generator (GEN) and an Evaluator (EVAL). Generator is endowed with the capacity to generate any output. EVAL, on the other hand, acts on a language-specific fashion and ranks constraints so as to generate a particular grammar. Henceforth, OT manages to draw a certain match between the universality of Grammar as proposed by Chomsky and Halle (1968) and the idiosyncrasy of each paradigm by ranking constraints in a language-specific fashion. In more specific words, GEN suggests an unlimited number of candidates, but EVAL accepts or refuses a certain candidate according to how it ranks constraints. If a candidate, for example, violates a high-ranked constraint, it is rejected as it incurs a fatal violation. But, if, on the other hand, it violates a low-ranked constraint, it survives and shows up as an optimal output.

For sake of clarification, I will display some hypothetical examples of constraints and rankings, Suppose we have two candidates: cand1 and cand2. And we have Constraint1 (const1) and constraint2 (const2). Constraint 1 ranks higher than constraint 2. Generating the optimal output will be shown by a tableau such as the one below:

/ input /	Const1	Const2
a- Cand1	* !	
b- Cand2		*

Both candidates violate once a constraint, but cand1 is ruled out since it fatally violates const1 which ranks high in the constraint hierarchy. Cand2 wins the race and is considered the optimal output as it violates const2 ranking low in the constraint hierarchy. So flexible a component of OT, as shown above, makes the strength of this theory since all constraints might be violated, but it is the ranking of the constraints that determines whether a violation is fatal or just minimal.

In this article I will take advantage of the analytical tools advanced by OT to account for the nature and distribution of schwa in MA . The constraints governing the distribution of this mid vowel will be advanced. And their ranking will also be specified in order to see how it affects the grammar MA.

2-2-The theory of Correspondence:

Constraints for OT are of two types: Well-formedness and faithfulness constraints. Well-formedness constraints act on outputs in respect of general constraints of well-formedness; while faithfulness constraints try to observe the matching of inputs to the derived output.

The idea of faithfulness has been developed with McCarthy and Prince (1995a) into a theory of correspondence. It was first used to study the relationship between base and

reduplicant in languages displaying reduplication as a morphological process. Correspondence is formalized within this theory as follows:

Given two linguistic forms S1 and S2 standing to one another as input and output , Base and reduplicant, etc, correspondence is a relation $ between any subset of Elements of S1 and S2. Any element & of S1 and any element B of S2 are Correspondents of one another if & R B

Correspondence can extend to many units of prosodic structure such as: moras, syllables, feet etc. It can also be held between base and reduplicant. and candidates (S1 and S2) come from GEN equipped with a correspondence relation. It is EVAL that assesses the completeness of correspondence between S1 and S2.

Constraints assessing correspondence between elements fall into some constraint families:

The MAX-constraint family:

Every element of S1 has a correspondent in S2. (MAX-IO and MAX-BR)

The DEP-constraint family:

Every segment of S2 has a correspondent in S1. (DEP-IO and DEP-BR)

The IDENT (F)-constraint family:

Let & be a segment in S1 and B be any correspondent in S2, if & is (xf), B is (xF).

The constraint MAX-IO is a reformulation of The early PARSE-constraint as advanced in Prince and Smolensky (1991,1993), but frees it from its total link to syllabification. The DEP-IO reformulates the constraint FILL as advanced in Prince and Smolensky (ibid).

McCarthy and Prince (Prosodic Morphology: Faithfulness identity) (19…) developed the correspondence theory by advancing correspondence between input and output to account for the interface between morphology and phonology. McCarthy and Prince (ibid) attempted a unified theory of faithfulness and identity. For, instance, in the domain of base/reduplicant, completeness is total reduplication and incompleteness is partial reduplication; while incompleteness in the domain of input/output correspondence is deletion

3- Critical review of the transderivational account:

3-1- Basic account

To provide an account to MA syllable forms after morphological operations, Boudlal (ibid) adopts works on transderivational correspondence between affiliated and simple forms. More precisely, he adopts the O-O correspondence as proposed by Basri et al (1998) and Selkirk (1999). He suggests that cyclic syllabification can be accounted for by establishing correspondence between affiliated and simple base forms. For example, a word like ‘ drəb+t’ meaning ‘I hit’ can be derived by comparing it to ‘drəb’ ‘he hit’ not to the root ‘drb’. The O-O correspondence is shown according to the form below:

Simple base (Drəb) O/ B-O identity (Drəbt)

I-O faith

/ Drb /

The analysis advanced by Boudlal goes further into the constituency of the output by making a distinction between stem and word. Thus, he gives:

O-O stem /faithfulness correspondence

O-O word / faithfulness correspondence

Examples of affixation to the stem occurs in Boudlal’s terms, when we add the subject affix (-t) ‘ I’; (na) ‘ we ‘ and (-u) ‘ they ‘. Affixation to the word shows up with object clitics (-k) ‘ you ‘; (-u) ‘him’; (-na) ‘us ‘. In words like ‘drəbt ‘ Schwa is inserted between b and t, which is a result of O-O stem correspondence and between b and k in ‘dərbək’ due to O-O word correspondence. When vowel initial suffixes are added to trilateral words, schwa moves backward, an example is ‘ ktəb’ ‘ kətbu’. But when the same morpheme is added to quadrilateral words the schwa is deleted as in ‘kərkəb’ ‘ kərkbu’. When a pronominal clitic is added, the result is that schwa moves back in trilateral words but is deleted in quadrilateral words. Successive examples are ‘drəb’ ‘ dərbək’ and ‘ kərkəb’ ‘kərkbək’. These examples

pushed Boudlal to posit that the two suffixes are attached to two different morphological configurations. The fact that the schwa is epenthesized before the suffix –t in 'drəbt' but not before the object affix –k in 'dərbək' reflects a distinction between affixation to the stem and affixation to the word. In affixation to the stem the correspondence is between the verb stem 'drəb' and the affixed verb form 'drəbt' shown in the digram below:

Input word (stem (drəb) stem Q) word S1
Output (d.rəb)
S1
Input word (stem (drəb) stem –t) word
Ouput (drəbt)
S2 (to be revised)
Correspondence is between S1 and S2 which are both stems.

On the other hand, 'drəb' 'dərbək' correspondence relates a word to another word as exemplified below:

Input word (stem (drəb) stem) word word (word (stem (drəb) stem –Q) word-k)word
S1 S2
Output (drəb) (dərbək)
S1 S2

So, schwa epenthesis finds its explanation when it does not apply in 'drəbt' in O-O stem correspondence as opposed to O-O word correspondence. This can be captured by invoking an O-O constraint (Anchor McCarthy 1997).

McCarthy refers to:

ANCHOR – POS when a segment position is head, initial, final is preserved under correspondence

ANCHOR-SEG demands that the segment be conserved in the designated position.

The constraint proposed by McCarthy is

O-ANCHOR-POS S1-S2 (cat1, cat2 P)
If S1cat1 E S
S2 cat2 E S2
S1 R S2, and
S2 stands in position P of CAT 2
Then S1 stands in position P os CAT 1.

To account for the difference between 'drəbt' and 'dərbək), correspondence has to refer to the initial position of the syllable in the derived output form and its base output form. Thus, we have:

O-O stem ANCHOR POS
O-O word ANCHOR POS
The constraints are formulated below:
a -O-O stem Anchor (O, O initial)

Where two strings S1 and S2 are in O-O stem correspondence relation and S1 is the base and S2 is the affiliate of that correspondence relation, a syllable-initial segment belonging to S2 must correspond to a syllable-initial segment belonging to S1.

a- O-O-word ANCHOR (O, O, initial)

Where two strings S1 and S2 are in an O-O-word correspondence relation and S1 is the base and S2 the affiliate of that correspondence relation, a syllable-initial segment belonging to S2 must correspond to a syllable-initial segment belonging to S1.

' drəb' is related to ' drəbt) in an O-O-stem correspondence relation. The word 'drəbt' shows that it is more important to keep the left edge of the stem when the suffix is added to avoid a minor syllable. To rule out an output like *'drəbət ', O-O-stem ANCHOR (O, O, initial) must dominate * Minor –O.

/d.rəb-t/	O-O Anchor O-O Initial	*Minor-σ
Base (drəb) stem		
a- D.rəb.t		*
b- dər.bət	* !	
c- d.rə.bət	* !	
d- də.rə.bət	* !	*

Candidates b,c,and d are all ruled out since they incur fatal violations of highly-ranked constraints O-O-stem Anchor (σ,O,initial). Candidate a wins the race although it violates *Minor-σ which ranks lower than O-O-stem constraint.

In affixation of words like ‘dərbək ‘, *Minor-σ is more important than conserving an initial position.

/drb-k/	*Minor-σ	O-O word Anchor (σ,O initial
Base ((d.rəb) stem)word		
a- dər.bək		*
b- d.rəb.k	** !	
c- d.rə.bək	* !	*

Since *Minor-σ dominates O-oword Anchor (O,O initial) and O-O stem Anchor (o, o initial), so by transitivity, O-O stem Anchor (o,O initial) dominates O-Oword anchor (O,O initial). Thus the final hierarchy is this:

O-O-stem Anchor (O,O initial > * Minor-o > O-O word Anchor (O, O initial).

For words like ‘dər.bu’ which violate O-O-stem-Anchor (O,O initial), ONSET decides for the optimal output.

/drb-u/	ONSET	O-O-stem Anchor
Base(d.rəb) stem		
a- dər.bu		*
b- d.rəb.u	* !	

3-2- weakness of the transderivational account

The account as advanced by Boudlal which claims that the affixation he stem is responsible for generating outputs like ‘drəbt’ and affixation to the word in outputs such as dərbək is not well-based. For instance, on what ground did he base his proposition? More than that, What about a candidate such as d.rə.bu which violates neither ONSET nor O-O-stem Anchor(O nO initial? All syllables have onsets and the correspondence between O-O as

concerns syllable initial positions is fully respected. The constraint hierarchy as proposed by Boudlal wrongly predicts that this candidate is the optimal output.

More than that the analysis provided by Boudlal is a complication of the grammar as it proposes for a simple case of syllabication a bundle of constraints though the placement of schwa can be explained in so simple a way in the analysis that will be displayed below.

To generate the optimal output for quadrilateral words like (kər.kəb), if we add the suffix -u, Boudlal posits the following hierarchy: ONSET.. complex >O-o-Stem-Anchor (O,O, initial). But this constraint hierarchy wrongly generates the output (kər.kə.bu) as the optimal output since it violates neither ONSET nor complex or O-O-Stem. Items like these question the adequacy of Boudlal's transderivational approach since it generates many wrong outputs. In my present account I will present a comprehensive analysis of MA syllable structure and the problem of cyclicity will be dealt with in an accurate manner using Kiparsky's account of semisyllables and another constraint active in MA which is *ə]σ. This constraint with some other constraints will elegantly derive many of the outputs resulting of morphological operations without resorting to such grammar-complicating constraints such as the ones proposed by Boudlal (2001). What Boudlal (2001) proposed for analysing syllable structure after morphological operation will be analysed elegantly and in a simple way without resorting to a complicated analysis. This account posits that the placement of schwa is caused by an active constraint in the language which is *ə]σ (SAib 1976). This constraint prohibits schwa open syllables and this causes the movement.

4- Alternative account:

As displayed above Boudlal (2001) analyses syllabification after morphological operations by resorting to cyclicity to generate outputs. But as discussed above, the account presented by Boudlal (ibid) fails to analyse many of the outputs resulting after morphological operations, especially schwa insertion outputs.

Let's take, for example, the syllabification of words as 'ktəb' after the addition of the morphological suffix –u denoting 'they'. According to Benhallam(1990), schwa is inserted from right to left. if we add the morpheme –u meaning 'they', we get the following output:

ktəb kətbu
lɜəb ləɜbu
xrəʒ xərʒu
ktəb kətbət
xrəʒ xərʒət

To account for these items, Boudlal posits a cyclic analysis based on output/output correspondence. He distinguishes between output suffixation to the stem and output suffixation to the word (see section above for a detailed presentation of this analysis and its weakness).

My analysis to these items is different from that of Boudlal. For instance, schwa is inserted between the last two consonants in the singular stem and between the first two consonants when the morpheme is added to respect a constraint active in the language which bans schwa open syllables. The constraint is proposed for Tashlhit by Saib (1976) and applies to Moroccan Arabic. It is written as follows:

*ə]σ

Schwa open syllables are not allowed. (saib 1976)

To generate an output as / kətbu/, the tableau below shows it:

/ ktb+u/	*ə]σ
a- ktə.bu	* !
b- kət.bu	

Candidate b is qualified as the optimal output as it respects the constraint which prohibits schwa open syllables. Candidate a is ruled out since its first syllable is made up of an open schwa syllable.

The same analysis accounts for the insertion of schwa in quadrilateral-rooted stems. For instance, derivation of the output from the input goes as follows:

kərkəb kər.kbu

Schwa is deleted because otherwise it would yield a schwa open syllable after addition of the plural morpheme.

The tableau below shows the derivation of the output:

/krkb+u	*ə]σ	Max-IO
a- kər.kbu		*
b- kər.kə.bu	* !	

Candidate a wins the race as it respects the high-ranked constraint *ə]σ which is very active in the language.

The constraint as proposed for quadrilateral words is still problematic since the destiny the c3 is not clear as its existence violates the constraint *Complex advanced in McCarthy and Prince (1993) necessitating that margins shouldn't branch. For this I adopt the account provided by Kiparsky (2003) considering this consonant as a semisyllable in violation of the constraint parseμ, but in respect of the constraint *Complex. The ranking is:

*Complex > Parseμ > Max-IO.

The derivation of an output such as 'kərkbu' goes as follows:

/krkb+u/	*Complex	Parse-μ	Max-IO
a- kər.kbu	* !		*
b- kər.k.bu		*	*

Candidate b is ruled out as it violates the high-ranked constraint *Complex; while candidate a wins the race as it violates minimally the constraint Parse-μ, but respects the constraint *Complex.

Outputs like 'drəbt' and 'drəbna' vs 'dərbu' where schwa changes position according to Boudlal's account as a result of output/output correspondence can be accounted for elegantly by the analysis proposed here.

/drb+t/	*ə]σ	MAX-IO
a- drəbt		*
b- drə.bt	* !	
/drb+u/	*ə]σ	MAX-IO
a- dərb+u		*
b- drə.b+u	* !	*

Candidates b for both outputs are ruled out since they both violate the constraint *ə]σ requiring that an open syllable should end in a vowel other than schwa.

Evidence for the above analysis comes from nouns as well as verbs. For example if we take a verb like 'safər' meaning 'travel', schwa is put between c2 and c3. If the morpheme –na meaning 'we', schwa keeps the same place as no violation of *ə]ə is incurred. But if we add the –u meaning 'we', we get the output 'safru'. The schwa does not show up since its inception would generate an output as 'sa.fə.ru' where the second syllable ends with the vowel schwa, which is a violation of *ə]σ. Another piece of evidence comes from verbs like 'ʃədd' meaning 'take'. if the morpheme –tu is added, we get an output as 'ʃəddəttu' or 'ʃəddatu'. The t is geminated in output one so as not to have a form like 'ʃəd.də.tu' where the second syllable is a nucleus open syllable, and in the second output the vowel a is inserted in place of ə.

The evidence for above analysis comes from some after morphological operations. An example are words like 'sənsla'. if the morpheme –ti meaning mine is added, we get either the form sən.səl.ti or sən.slət.ti. In both forms the tendency is to avoid shwa open syllables. In output one the t is put between c3 and c4, thus, occupying the position of a nucleus of a closed syllable, and in output two the -t is geminated to avoid a form such as 'sən.slə.ti' where shwa occupies the position of the nucleus of an open syllable, which is bannad by *ə]σ.

This analysis is more elegant as it does not resort to two types of suffixation as proposed by Boudlal: suffixation to the stem and suffixation to the word, which is a complication of the grammar, something not sought by the premises of the linguistic theory. As a matter of fact, The main aim of a theory of grammar is to propose the simplest grammar possible which describes human languages simply and accurately.

5- Concluding remarks:

In this study I tried to present an account for the placement of schwa in MA after morphological operations. For instance, the article tried to answer the research question: why does schwa change place when some morphemes are attached to words. The analysis was shown to be simpler and of much analytical power than the account advanced by Boudlal (2001). It was found that a combination of constraints a la OT interact together to to yield such a movement of schwa. More specifically, the constraint *ə]σ, which bans schwa open syllables in combination with Max-IO and DEP-IO and other constraints, are responsible for the placement of schwa when suffixes are added to stems. It was also shown that this analysis is much simpler and more elegant than the one advanced in Boudlal (2001).

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