

Regressive Rounding Harmony in Libyan Arabic

Yousef Mokhtar Elramli¹
Faculty of Arts, Misrata

Tareq Bashir Maiteq
College of Industrial Technology

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Abstract

The aim of this paper is to study Regressive rounding harmony induced by a suffixal back round vowel in the Libyan Arabic dialect spoken in the city of Misrata. The skeletal structure in the collected words is a /CVCVC-/ stem followed by the third person plural suffix /-u/. Consequently, the derived form of the examined words becomes /CVCVCV/. Following a rule of re-syllabification, the coda of the ultimate syllable in the stem becomes the onset of the newly formed syllable (ultimate in the derived form). Thus, in the presence of the suffix /-u/ in the derived form, all vowels in the word must harmonise with the [+round] feature of /-u/ unless there is a high front vowel /i/ intervening. In such cases, the high front vowel is defined as an opaque segment that is incompatible with the feature [+round]. Syllable and morpheme boundaries within words do not seem to contribute to blocking the regressive spreading of harmony. An autosegmental approach to analyze these words is adopted here. It is concluded that there are two sources in underlying representations for regressive rounding harmony in Libyan Arabic. One source is floating [+round] and another source is [+round].

Keywords: *rounding harmony, autosegmental, syllable*

yelramli@art.misuratau.edu.ly ¹

الاتباع التدويري الرجعي في اللهجة الليبية

يوسف مختار الرملي
كلية الآداب، جامعة مصراتة

طارق بشير معيتيق
كلية التقنية الصناعية، مصراتة

ملخص البحث

تهدف هذه الدراسة إلى تقديم تحليل لغوي لظاهرة الإتباع التدويري الرجعي regressive rounding harmony في اللهجة الليبية المتداولة في مدينة مصراتة. تستخدم هذه الدراسة نظرية الصَوَانَةِ ذاتِيَّة التَّقْطِيعِ Autosegmental Phonology لتحليل هذه الظاهرة اللغوية. في اللهجة التي تدرسها هذه الورقة، تؤدي إضافة اللاحقة /-u/، وهي صوت صائت يدل على جمع الذكور الغائبين، إلى تغير في الفعل المضافة إليه. فالملاحظ أن إضافة هذه اللاحقة إلى أي فعل تؤدي إلى تأثر كل الصوائت في ذلك الفعل، بحيث تكتسب تلك الصوائت سمة الاستدارة بعد أن كانت تتحلى بسمات أخرى مختلفة. ومن الملاحظ أن الحدود الصرفية (المورفيمية) أو المقطعية لا تمنع هذه الظاهرة إذ أن الإتباع هنا يتخطى كل هذه الحدود. والجدير بالذكر أن كل ذلك لا ينطبق على الصائت الأمامي العالي /i/ إذ أنه يعتبر صائتا كاجبا يمنع وجوده تحقق ظاهرة الإتباع التدويري.

1. Introduction

Vowel harmony is a process that exists in a number of languages where vowels within a given domain must agree in their features. In linguistic practice, vowel harmony has been extensively studied by phoneticians and phonologists. For example, in phonetic terms, rounding harmony or vowel-to-vowel coarticulation, i.e., the lip rounding gesture during the production of vowels is one of the three major dimensions along which vowels are classified. The lip rounding configuration during speech is represented by the feature [round]

(Farnetani, 1999, p. 144). The other two dimensions are related to tongue configuration and represented by [high] and [back] features. In many languages of the world, lip rounding is a distinctive feature as it contrasts pairs of vowels as the case in the English words /boot/ and /beat/. Much previous phonetic research on the control of anticipatory feature spreading and coarticulation focused on the "look-ahead" or "feature spreading" models (Benguerel & Cowan, 1974; Daniloff & Moll, 1968; Henke, 1966, Perkell, 1986, Boyce, 1989). These models predict that the articulatory planning mechanism scans upcoming segments and implements their features as long as they do not contradict with the features of the preceding phonemes. For example, the non-labial /s and k/ in /sku:t/ are made with the tongue and do not conflict with simultaneous rounding. These models differ in terms of the magnitude of the coarticulatory effect. For example, a feature-spreading account predicts an all-or-none spreading of the effect. This is usually referred to as a categorical spreading effect. By contrast, a phonetic coarticulatory process is perceived as a gradual effect that decreases over time. In spite of these differences, all these models agree in that an upcoming feature is anticipated in advance and can, therefore, be detected prior to the trigger or source of the spreading.

In phonological theory, vowel harmony is a system of phonological organisation where all vowels must agree, i.e., harmonise in terms of their features within some spans in spoken utterance. Harmony and spreading phenomena made a challenge to traditional linear approaches within early generative phonology. Thus, an autosegmental approach to phonological analysis was developed to tackle vowel harmony in Turkish (Clements & Sezer, 1982), emphasis in Arabic (Hulst & Smith, 1982; Hoberman, 1988), and nasalisation in Apple-cross Gaelic (Hulst & Smith 1982). According to (Clements & Sezer, 1982: 214), "The primitive units of autosegmental phonology - segments, tiers, association lines - permit the expression of a richer variety of arrangements of distinctive features than is possible under linear theories of phonology".

A major issue for these phonetic and phonological studies is to bridge the gap between underlying representation and surface representation of spoken language. The present paper analyses rounding harmony in one variety of Libyan Arabic. In this dialect of Arabic, there are cases where underlyingly [-round] vowels and consonants coarticulate or harmonise with a following suffixal round /-u/ vowel within spans of utterances. Sometimes the process is confined to syllables to which the suffixal vowel belongs. Other cases show that vowels do harmonise with the suffixal vowel throughout the entire word.

Finally, it should be stressed that vowel harmony has been well-documented in Standard Arabic, using Arabic as a language of research. Palestinian Arabic vowel harmony has also been studied (e.g. Kenstowicz, 1981; Abu-Salim, 1987; Monahan, 2003). This interesting phenomenon, however, has not received due attention in Libyan Arabic, apart from sporadic reference in dissertations. To the best of our knowledge, no study has hitherto been devoted solely to Libyan Arabic vowel harmony in general nor to rounding harmony in particular.

2. Methodology

As has already been stated, this paper analyses regressive rounding harmony within an autosegmental phonology framework. The variety under consideration is the authors' mother tongue. Therefore, the authors used their own examples to represent the investigated process. Two sets of data have been collected, and the third person plural suffix /-u/ has been added to each example in the data set in order to see the influence of this vocalic suffix on the vowels of the stem.

3. A sketch of the analysis

Within an autosegmental approach to phonology, as proposed in (Goldsmith, 1976; Clements & Sezer, 1982), and developed in (Halle

& Vergnaud, 1982; Hulst & Smith, 1982; Hoberman, 1988), any analysis of vowel harmony should include five parameters. We will begin the description of rounding harmony in Libyan Arabic by stating these five parameters:

- (a) the set of P-segments
- (b) the set of P-bearing units
- (c) the set of neutral segments
- (d) the set of opaque segments \emptyset
- (e) the domain of association

In many cases, an entire word including the stem, prefixes, and suffixes is either assigned the features [+round] or the feature [-round]. Generally, the lip rounding feature or the lack of it does not spread between words. Word stems are lexically specified as [+round] or [-round], and do not generally change in derivation or inflection. While most stems are either [+round] or [-round] throughout. The [round] feature is represented on its own separate autosegmental tier. Its status in underlying forms and its manner of autosegmental association are described by the following principles: (i) Lip rounding associates with syllables rather than with segments. (ii) While lip rounding sequence of utterance has an underlying autosegment [+round], a non-round span has no specification for the feature [round]. The feature value [-round] does not appear in the underlying form, but all syllables not associated with [+round] are eventually pronounced as [-round] by default. (iii) Lip rounding in a mixed word is associated in the underlying structure with a particular syllable. Linkage with an underlyingly associated autosegment spreads leftward to the beginning of the word. (iv) In an entirely rounded word, the feature [+round] is initially floating, i.e. not associated with any particular syllable other than the syllable containing the trigger. A floating autosegment, according to Trask (2004, p. 146), is “a label applied to any autosegment which, at some level of representation, is

not associated to the skeleton”. In this case, the floating autosegment associates with all syllables in the word. The evidence for these hypotheses is presented below in two parts. In 3.1, we present the analysis of mixed words where [+round] is assigned to the syllable only. In 3.2., we treat words which are wholly assigned the feature [+round] or wholly assigned the feature [-round].

4. Associated [+ round] and the spread of harmony

Three sets of trisyllabic words, i.e. /CVCVCV/ are collected for regressive rounding harmony in Libyan Arabic. The antepenultimate syllable has either /i, a or ə/. The penultimate syllable always has /a/, and the ultimate syllable is always with an /u/ vowel nucleus. The stress pattern is kept uniform across all the sets of these words in that the penultimate syllable is bearing the primary stress. Thus, the derived skeletal structure of these sets of words is /CVCVC-/ stem followed by the plural suffix /-u/. Thus, the obtained morphological pattern of the examined words is /CVCVCV/.

4.1. The syllable as the P-bearing unit:

The syllable structure in the dialect investigated has the following types¹ (Elramli, 2012):

Short vowels		
CV	si.rag	‘he stole’
CVC	xub.za	‘braed’
CVCC	ʃarʃ	‘bastard’
CCV	gas.sma	‘share it’
CCVCC	smint	‘cement’
CCVC	sbil	‘excuses’

¹ Some researchers (e.g. Laradi, 1983, pp. 25-26) add the structures VCC and VVC to the possible Libyan Arabic syllables. These two structures are unlikely to occur in Libya Arabic. The reason is that these are onsetless and the onset is an obligatory constituent of Arabic syllables.

Long vowel

CVV	dii .ma	‘always’
CCVV	graa .ya	‘study/reading’
CVVC	ween	‘where’
CCVVC	klaab	‘dogs’

The following set of words shows that a syllable must be wholly assigned the feature [+round] or the feature [-round]:

(3rd msc.sg.)	(3rd msc.pl.)
simaʕ	simiʕu
rifaʕ	rifiʕu
nifaʕ	nifiʕu
kitab	kitibu

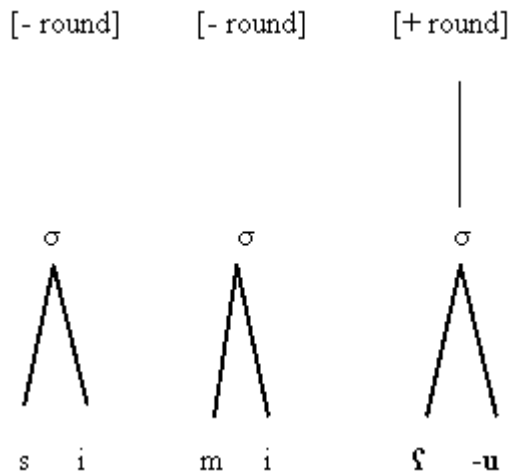
As can be seen in the word pair /simaʕ/ and /simiʕu/, the suffix /-u/ is added to the stem /simaʕ/ giving the derived form /simiʕu/. This observation can be straightforwardly expressed in the analysis sketched above, by stating that the feature [round] associates to the syllable, on a separate autosegmental tier, rather than to the segment. More specifically, when the suffix /-u/ is added to the word /simaʕ/ the rounding feature spreads to the syllable onset – after a process of re-syllabification, where the coda of the ultimate syllable in the word /si.maʕ/ becomes the onset of the ultimate syllable in /si.mi.ʕu/. This is due to a re-syllabification rule that affiliates the coda of the ultimate syllable in /si.maʕ/ to the newly formed syllable in /si.mi.ʕu/.

The pattern here is that the rounding harmony covers only the ultimate syllable in [simiʕu]. In other words, the /ʕ/ became the onset of the new syllable /ʕu/ after re-syllabification took place. Thus, only the ultimate syllable /ʕu/ in [simiʕu] is assigned the feature value [+round], whereas the antepenultimate and penultimate syllables are assigned the feature value [-round]. This pattern is consistent with the

“look-ahead” and “feature spreading” models of speech production. These models assume an articulatory planning component that scans features of upcoming segments. These features, then, are assigned to the preceding segments as long as there is no conflict between them (segments and new migrated features). This is what exactly happens here. The pharyngeal /ʁ/ occupies the onset position in the ultimate syllable. This pharyngeal segment does not have any feature(s) that theoretically contradict with lip-rounding. Once this is guaranteed by the scanning mechanism in the model, the [+round] feature value is assigned to the pharyngeal onset of the syllable. However, a remaining question is why the [+round] feature value is blocked from spreading any further than the pharyngeal segment? This is so because the high front vowel /i/ preceding the pharyngeal is not theoretically compatible with the [+round] feature value. This conflict between features gives rise to the [-round] feature value assigned to the penultimate and antepenultimate syllables in the word. This seems in agreement with the notion of “articulatory syllable” developed in (Kozhevnikov & Chistovich, 1965) which is a vowel plus any number of consonants that precede it. Kozhevnikov & Chistovich report that the lip rounding for the vowel /u/ begins with the closing phase of the consonant that precedes the vowel. On this basis, they conclude that the temporal extent for lip rounding indicates the size of the articulatory syllable. If consonants of the articulatory syllable do not have contradictory features with /u/, lip-rounding will start simultaneously with the onset of the syllable.

In order for the autosegmental approach to account for the phonetic shape here, the rules that specify the phonetic detail must have full access to all components of the final phonological representation. For the feature [round] to be specified to the syllable means that it becomes a property of all the segments which belong to that syllable. This means that [+round] is not specified to individual segments within a syllable, but rather, they are specified to the entire syllable (onset and nucleus). Therefore, segments in the first two

syllables are not associated with an autosegment and will consequently surface as [-round]. This is a deviation from standard autosegmental phonology. This position is taken by (Hulst & Smith, 1982, p. 317; McCarthy, 1986, p. 227), where “the CV tier provides the pivot which allows all other autosegmental tiers to be correctly synchronised”, according to (Hoberman, 1988, p. 6). In this case, the prosodic feature [round] in Libyan Arabic which is linked to the entire syllable on a separate autosegmental tier will be conflated with other features corresponding to the right segmental CV tier. From there, at the autosegmental level of representation, the C and V slots of the syllable are phonetically associated with the feature [round].



As can be seen in this example, the first two syllables are not associated with the autosegment by conventional association lines, and they surface as [-round]. The opaque segment /i/ will be manifested in the surface representation as non-round, due to a redundancy rule (Halle & Vergnaud, 1982). Interestingly, the behaviour of the opaque segment is not only limited to not acquiring the rounding effect, but rather, it blocks the harmony from spreading. It is plausible to assume that the high front vowel exerts its own feature effect to the preceding segments. A major issue in

autosegmental phonology is to account for the spreading and blocking of harmony phenomena, unlike linear accounts in phonological analyses.

The notion of extraprosodicity (Kiparsky, 1995) readily handles the blocking of the harmony found in these examples of mixed words in Libyan Arabic. The penultimate and antepenultimate syllables of /simiʃu/ would be marked as extraprosodic in the underlying representation of the word, and the lip-rounding feature would be floating. The extraprosodicity of both syllables /si.mi/ would disallow the feature value [+round] from associating with these two syllables. This results in the disallowance of the spreading of the rounding harmony to the preceding syllables. It is important to remind here that the syllable containing the trigger is the P-bearing unit, as stated in the five parameters above.

Interestingly, the status of the high front vowel /i/ is a special one. As discussed above, the rounding harmony is assigned to the entire syllable. Once /i/ intervenes, it does not harmonise with the following rounding. This can be understood as the high front vowel is theoretically incompatible with the rounding feature. Importantly, /i/ prevents the spreading of left-to-right rounding harmony. The prevention of the spreading might be interpreted in that the /i/ spreads its own feature [+high], [-round] in a regressive fashion to the preceding syllable(s). On the basis of this, it becomes evident that the opaque segment /i/ can be defined as: a nonundergoer, blocker and spreader of its own harmony.

4.2. Whole words having the [+round] feature harmony

Lip rounding harmony induced by a suffixal /-u/ can spread throughout an entire word. This is the scenario, of course, in the absence of the high front vowel /i/ which is an opaque segment to the rounding harmony effect. The vowels /ə/ and /a/ as well as the other consonants in the dialect are transparent to the rounding harmony effect. This is evident in the following examples.

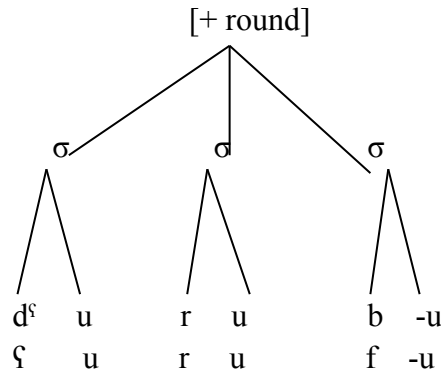
(a)

(3 rd msc.sg.)	(3 rd msc.pl.)	
tʰəlab	tʰulub-u	'asked'
dʰərab	dʰurub-u	'hit'
tʰəbaʃ	tʰubuʃ-u	'typed'
rədʰaʃ	rudʰuʃ-u	'suckled'
rəfədʰ	rufudʰ-u	'refused'
gərasʰ	gurusʰ-u	'pinched'
gənasʰ	gunusʰ-u	'sniped'

(b)

(3 rd msc.sg.)	(3 rd msc.pl.)	
ʃaraf	ʃuruf-u	'knew'
ħaran	ħurun-u	'refused'
ʃarag	ʃurug-u	'perspired'
ħamag	ħumug-u	'got angry'
harab	hurub-u	'fled'
yaraf	yuruf-u	'ladled'
ħarag	ħurug-u	'burned'

These words show that the lip rounding harmony induced by the word final plural morpheme /-u/ extends to cover the entire word. All these derived forms are trisyllabic words. The first set in (a) has the skeletal pattern /CVCVC-u/ where the nucleus of the antepenult is underlyingly /ə/, and the nucleus of the penult is underlyingly /a/. In the second set of words (b), the nuclei of both syllables are underlyingly /a/. It is clear here that lip rounding is attributable to the word final plural morpheme /-u/. Thus when this round vowel is present, entire syllables, and consequently all segments in the word, are rounded.



In words which are wholly rounded, the feature [+round] is initially floating in the derivation. This means that it is not associated with any particular syllable. As was discussed above, a floating autosegment at some level of representation is not associated with the CV skeleton. For example, minimal pairs like /dʰərab/ vs. /dʰurubu/ and /ʕaraf/ vs. /ʕurufu/ contain the vowels /ə/ and /a/. These vowels according to the parameters listed above are transparent to the rounding harmony. The ultimate syllables /bu/ and /fu/ are the P-bearing units to which the underlying [+round] autosegment is linked. At another level of representation, the [+round] feature is a floating autosegment and consequently associates with all syllables in the words. Therefore, in the absence of the intervening opaque segment /i/ the rounding harmony is allowed to spread in a leftward fashion throughout all syllables of the word. These words provide evidence that the word serves as the domain of the rounding harmony triggered by the suffixal vowel /-u/.

5. Conclusion

In the present paper regressive rounding harmony has been studied in words having the skeletal structure /CVCVCV/. The ultimate vowel in the sequence is the suffix /-u/. When this suffix is attached to the word all vowels in the word must agree in terms of the rounding feature. Thus, on the basis of the discussion in sections 3.1

and 3.2, we can restate the five parameters to fit the rounding harmony phenomenon in Libyan Arabic as follows:

- (a) the set of P-segment is the feature [+round].
- (b) the P-bearing unit is the syllable.
- (c) the set of neutral segments includes all vowels except /i/ and all consonants.
- (d) the set of opaque segments \emptyset is the high front vowel /i/.
- (e) the domain of association is the word.

In underlying phonological representation, Libyan Arabic has two sources of rounding harmony, i.e., floating [+round] and [+round]. The floating round feature is not linked to a particular syllable in the skeleton. However, the feature [+round] is associated with a certain syllable in the skeleton. This is evident in wholly rounded words. However, in words which are not wholly rounded as /simiʃu/, an opaque segment in the system behaves as a nonundergoer, blocker and spreader of its own feature. Consequently, the penultimate antepenult syllables surface as having the feature [-round]. This analysis provides evidence that the word serves as the domain of rounding harmony.

References

- Abu-Salim, I. M. (1987). Vowel harmony in Palestinian Arabic: Ametrical perspective. *Journal of Linguistics*, 23(1), 1-24.
- Benguérel, A. P., & Cowan, H. A. (1974). Coarticulation of upper lip protrusion in French. *Phonetica*, 30(1), 41-55.
- Broselow, E. (1976) *The phonology of Egyptian Arabic*. Doctoral dissertation. University of Massachusetts.

- Clements, G. N., & Sezer, E. (1982). Vowel and consonant disharmony in Turkish. The structure of phonological representations, 2, 213-255.
- Daniloff, R., & Moll, K. (1968). Coarticulation of lip rounding. *Journal of Speech and Hearing Research*, 11(4), 707-721.
- Elramli, Y. M. (2012). *Assimilation in the phonology of a Libyan Arabic dialect: a constraint-based approach* (Doctoral dissertation, Newcastle University).
- Farnetani, E. (1999). Labial Coarticulation. In WJ Hardcastle and N Hewlett, (eds) *A Handbook of Phonetic Sciences*. Oxford: Blackwell.
- Goldsmith, J. (1976). An Overview of Autosegmental Phonology. *Linguistic Analysis* 2(1): 23-68.
- Halle, M. and Vergnaud, J. (1982). On the framework of utosegmental phonology. In Harry van der Hulst and Norval Smith (eds.) *The structure of phonological representations*. Vol. 1. Dordrecht, Foris, pp.65–82.
- Henke, W. (1966). *Dynamic Articulatory Model of Speech Production Using Computer Simulation*. Cambridge: MIT.
- Hoberman, R. D. (1988). Emphasis harmony in a Modern Aramaic dialect. *Language* 64(1): 1-26.
- Hulst, H. van der & Smith, N. (1982). Prosodic domains and opaque segments in autosegmental theory. *The structure of phonological representations (Part II)*, 311-336.
- Kenstowicz, M. (1981). Vowel harmony in Palestinian Arabic: a suprasegmental analysis. *Linguistics*, 19(5-6), 449-466.
- Kiparsky, P. (1995). Some consequences of Lexical Phonology. *Phonology yearbook2*, ed. by Colin J. Ewen & John M. Anderson, 85-138. Cambridge: University Press.

Kozhevnikov, V. A., & Chistovich, L. A. (1965). Speech: Articulation and perception.

Monahan, P. J. (2003). Harmony and metrical structure in Palestinian Arabic. In *Proceedings of the 2002 Texas Linguistics Society. Austin, TX: Texas Linguistics Forum.*