Moroccan Arabic Consonant Harmony: A Multiple Causation Hypothesis*

Georgia Zellou
University of Colorado, Boulder

Contemporary Moroccan Arabic has an innovative long distance consonant harmony process. There are several possible accounts of how this feature arose in Moroccan Arabic. First, the same consonant harmony process can be seen in the neighboring Berber languages, which have been in intense contact with this dialectal variety of Arabic for hundreds of years. Thus, Moroccan Arabic consonant harmony can be analyzed as a product of language contact. On the other hand, this type of regressive assimilation of palatal consonants is the most common type of consonant harmony to arise independently cross-linguistically. Thus, Moroccan Arabic consonant harmony can be analyzed as arising language-externally. This investigation provides an analysis of the consonant harmony process in Moroccan Arabic as arising through a combination of language internal and language contact origins.

1. Introduction

Dialectal Moroccan Arabic (Semitic, Afro-Asiatic) has an innovative long distance consonant harmony process. This consonant harmony was first documented by Zellig Harris (1942, 1944). Subsequent descriptions of the grammar have mentioned this feature (c.f. Harrell 1962, Heath 1987), but an examination of its distribution and origin has never been attempted. The aim of this paper is an in-depth description of this process and its distribution in the language. While vowel harmony is a common phenomenon arising in language, typological studies have noted how consonant harmony phenomena are much rarer cross-linguistically (Hansson 2001: 2). Interestingly, a consonant harmony process similar to that in Moroccan Arabic is also found in a family of languages in contact with Moroccan Arabic: the Berber languages (Afro-Asiatic). Frajzyngier and Shay state that “when a typologically rare phenomenon is exhibited in neighboring languages... the question arises whether the phenomenon may be a product of language-internal development or a product of language contact” (2008: 1). Thus, I further investigate several possible hypotheses of how this feature arose in Moroccan Arabic. They are characterized as the language-external hypothesis, the language-internal hypothesis, and the multiple causation hypothesis.

The first hypothesis, the language-external hypothesis, relies on the fact that a similar consonant harmony process can be seen in the neighboring Berber languages, which have been in

* I would like to thank Zygmunt Frajzyngier, Erin Shay, Amina Mettouchi, and Joanna Chociej for their invaluable comments and constructive criticism on earlier drafts of this paper. Any errors are my own. Abbreviations used are as follows: 1 – First Person; 2 – Second Person; 3 – Third Person; SG – Singular; PL – Plural; F – Feminine; M – Masculine; DEF – Definite Article; DEM – Demonstrative; COMP – Complementizer; CONJ – Conjunction; PRF – Perfective; IMPF – Imperfective; PROG – Progressive; FUT – Future; POSS – Possessive; PASS – Passive.

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intense contact with this geographically isolated variety of Arabic since approximately the 7th century. Thus, the first hypothesis would suggest that Moroccan Arabic consonant harmony can be analyzed as a product of language contact. On the other hand, the language-internal hypothesis relies on information suggesting this type of consonant harmony is the most common type of consonant harmony to arise independently, cross-linguistically. Thus, Moroccan Arabic consonant harmony could be analyzed as arising solely through language-internal phonological changes. A final possible explanation of the origin of this process supports both of the previous situations. Through the multiple causation hypothesis, Moroccan Arabic consonant harmony is examined as a process that has originated and then was subsequently reinforced and propagated both language-internally through spontaneous speech errors and by language contact with the Moroccan Berber languages.

This investigation examines data from numerous different sources in relation to the consonant harmony process in Moroccan Arabic. In section 1, the consonant harmony process in Moroccan Arabic is examined and described based on its distribution in naturally occurring conversation and narrative data. By an examination of data from descriptive grammars and (where possible) texts of naturally occurring speech, it is shown that a consonant harmony process can be found neither in Classical Arabic, nor any contemporary dialect of Arabic. Moreover, based on the comparative Arabic data, the consonant harmony was not a feature inherited from the classical language, nor was it a feature that arose in an older vernacular that later split into the regional dialects in North Africa (Algerian, Tunisian, Moroccan). Thus, the data suggests that the consonant harmony process uniquely arose within the Moroccan dialect.

Next, all of the possible hypotheses are explored for how this long distance assimilation came into Moroccan Arabic. In section 2, the consonant harmony process in Moroccan Arabic is compared to the consonant harmony process found in the Berber languages and examined as arising through language contact. In section 3, the consonant harmony process in Moroccan Arabic is analyzed from the perspective of a language-internal innovation. In section 4, the multiple causation hypothesis is proposed as the best possible explanation of the origin of the consonant harmony in Moroccan Arabic.

2. Consonant Harmony in Moroccan Arabic

In Moroccan Arabic, innovative forms of words occurring with harmonized, or assimilated, consonants synchronically alternate with their conservative, non-harmonizing forms. Some words displaying the long distance consonant assimilation are illustrated below in (1) under the column labeled Harmonized, while the forms without the consonant harmony are under the column labeled Non-harmonized.
The consonant harmony occurs regressively between coronal sibilants of a stem. These consonants undergo agreement of the [+distributive] feature, converting the place of anterior alveolar fricatives to post-alveolar. The trigger is always the voiced post-alveolar fricative [ž] and acts on a preceding voiced or voiceless anterior alveolar fricative [s z]. Also, while the assimilation is most often long distance (non-adjacent), it can occur in adjacent environments, as shown above in (1b) šžən 'prison'.

There are various constraints on the nature of this consonant harmony. First, the consonant harmony is blocked when the trigger and target occur in the reverse order. As shown in (2), this process follows strict regressive directionality; žazira 'island' and žazaʔir 'Algeria', which contain a post-alveolar fricative and an anterior alveolar, do not undergo harmony due to the ordering of trigger and target.

Furthermore, the voiceless alveolar fricative [š] does not trigger the consonant harmony. As shown below in (3), a harmonized *šbaʕtaš is an ungrammatical variant of sbaʕtaš 'seventeen'.

While there are no lexical items in Moroccan Arabic containing alternations /s(or z)...š/ ~ /š (or ź)...š/, there are lexical items containing identical segments of this type, i.e. šawəš 'doorman' (*sawəš), ŝlwəš 'shake down' (*slwəš), šašiya 'type of hat' (*sašiya) (Heath 1987:214).

The alternations in (1) are in free variation synchronically with speakers. However, the innovative variants with the harmonized consonants are more common and occur more frequently in recorded texts than the conservative forms. Nonetheless, it is uncommon for a speaker to use both an unharmonized form and a harmonized form of the same root in the same discourse. Most informants use harmonized forms with other harmonized forms within a discourse. The following natural discourse example illustrates this tendency:

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1 The Rabat-Sale (Coastal East, Central, Urban) dialect region is where most of the Moroccan Arabic data are taken from in this paper.
2 The innovative split between /ř/ and /ř/ in the Moroccan dialect is in some cases allophonic and in other cases, such as in ‘window,’ lexical (Heath 1987).
3 This word takes the form /səṛžəm ~ šəṛžəm/ in various Moroccan Arabic dialects.
Consonant Harmony in Conversation Data

1 H: ʕraf6ti, ṛžeʕ6na men, men uh... men
know.PRF-2SG return.PRF-1PL from
l-vacances hadi, hadi šhal dabä... ehh
DEF-vacation this.F how-much now... uhh
‘You know, we got back from, from, uh, from vacation, quite, quite a while now.’

2 M:  ehhh
uhhh
‘uhhh’

3 H:  ši žuž semana-t
some two week-PL
‘Some two weeks’

4 M:  iyeh
yes
‘Yes’

5 H:  žuž semana-t w bdina...
two week-PL CONJ start.PRF-1PL
‘Two weeks and we started...’

The dialogue in (4) was taken from a discourse recorded by the investigator. Within the excerpt, speaker H begins line 3 by saying “some two weeks” with the word “two” as the harmonized [žuž]. Within this line, he gets interrupted by speaker M, who begins to speak. Thus, speaker H repeats the same phrase in line 5, and still uses the harmonized form [žuž].

Similarly, harmonized forms only occur with other harmonized forms within a phrase, as illustrated below in (5):

(5)  M:  ehh šažžal žuž klâm.
uhh record.PRF-3SG two word.PL
‘Uhh, he recorded two words’

a.  *šažžal zuž klâm
b.  *šažžal žuž klâm

In (5), the speaker uses two harmonized forms within the same utterance. When asked if an utterance with one of those forms in the unharmonized alternation is acceptable, as shown in (5a-b), the speaker judges it as ungrammatical4. This is consistent with the textual data found in other sources, as well. The data in (6) and (7), below is taken from a single narrative in a compilation of textual data. The line in (6) is from an earlier passage in the story. The lines in (7a-b) are from a later passage in the same story.

4 The speaker judges a phrase with two non-harmonized forms as grammatical (i.e. sažžal zuž), but not common.
MOROCCAN ARABIC CONSONANT HARMONY: A MULTIPLE CAUSATION HYPOTHESIS

(6) w-had l-mtwsṣat ka-y-hrras ź-žaž, w-l-xṣab,
and-DEM DEF-middle PROG-3SG-smash.IMPF DEF-glass and-DEF-wood
w-l-qṣəb
and-DEF-reed
‘And that middle (one) smashed the glass and the wooden pole and the reed.’
(Abdel-Massih 1974: 105)

(7)

a. qal-t l-bbʷa-ha “ḥta l-lydd lih, ſad
say.PRF-3F to-dad-3F.POSS until DEF-tomorrow COMP just
y-kun z-zwaž”
3SG-be.IMPF DEF-marriage
‘She said to her father ‘(wait) until tomorrow, then there will be the marriage’

b. wṣḷ n-nhar baš ſadya tt-zwəž b-l-ṣabd
come.PRF.3SG DEF-day in.order FUT PASS-marry to-DEF-slave
‘Then came the day for her to get married to the slave’
(ibid.: 108)

The utterance in (6) contains a harmonized form of the word ‘glass’ źaž. Later in the story, in line (7a) the speaker uses a non-harmonized form of the word ‘marriage’ zwaž. Subsequently, in line (7b), the speaker also uses the non-harmonized form of the verb ‘to marry’ zwəž. Thus, it is not the case that speakers will alternate between harmonized and non-harmonized forms within a topic, let alone within the same utterance (c.f. (5) above). However, the above data give evidence of inter-speaker variation in the use of both types of forms.

Thus, a phonological innovation can be observed in contemporary Moroccan Arabic. Within a lexical item, a voiced post-alveolar fricative triggers assimilation of place of articulation in any preceding voiceless alveolar fricative. This phenomenon is a consonant harmony process which has recently come into the language. How this feature came into the language, however, is not straightforward. Several hypotheses need to be examined in order to answer the central question.

3. The Language-External Hypothesis

The most common evidence of contact-induced language change is the addition of phonological features in the receiving language from the donor language which were not present in the receiving language before contact (Thomason 2001: 87).

The language-external hypothesis suggests that the consonant harmony process in Moroccan Arabic is the result of contact with a source language. According to Thomason and Kaufman (1988) and Thomason (2001), in order to support this hypothesis at least six requirements are necessary to show that a feature has been diffused into a receiving language. The requirements are: (1) identify the source language, (2) identify and compare the shared feature in both the source and receiving language, (3) prove that the feature was not present in the receiving language before contact, (4) prove that the feature was present in the source language before contact, (5) look at the receiving language as a whole and identify other contact-induced changes that diffused from the source language, and finally (6) look for plausible internal motivations. The first five requirements are discussed in the following sections. The sixth and final requirement is explored in section 4.
3.1 Berber as the Source of Consonant Harmony

A consonant harmony process similar to that found in Moroccan Arabic is present in several Berber languages. The Berber languages can be divided into several language families, located in various countries in North Africa including Morocco, Algeria, Mali, Egypt and Mauritania. The main Moroccan Berber language families include the Zenati (including Tarifit and Figuig), Tamazight, and Tashlihyt. Kossmann estimates that Berber is spoken by close to half the population of Morocco (1997: 1). In Algeria, the main Berber language family is Kabyle (Taqbalit).

Regarding the Tamazight (Middle Atlas, Central Morocco) Berber family, a regressive sibilant harmony is demonstrated from the Ayt Ndhir dialect, as illustrated below in (8).

(8) Ayt Ndhir (Tamazight) Berber

<table>
<thead>
<tr>
<th>Stem</th>
<th>Causative Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ss-naw/</td>
<td>[ss-naw]</td>
<td>‘cook’</td>
</tr>
<tr>
<td>/ss-əčč/</td>
<td>[šš-əčč]</td>
<td>‘feed’</td>
</tr>
<tr>
<td>/ss-ənζ/</td>
<td>[zz-ənζ]</td>
<td>‘sell’</td>
</tr>
<tr>
<td>/ss-užey/</td>
<td>[žž-užey]</td>
<td>‘heal s.o.’</td>
</tr>
</tbody>
</table>

(Penchoen 1973: 44-5)

(8a) shows a verb stem with the causative prefix /s-\ to derive the verb ‘cook’. The form in (a) is an example of a stem with no trigger for consonant harmony. On the other hand, (8b-6) illustrate stems that contain consonants with sibilant features that trigger long distance assimilation with the causative prefix. The same process is found in other documented Tamazight dialects.

The Tashlihyt (Southwest Morocco) dialects of Berber have an identical consonant harmony. The data below is from Imdlawn Tashlihyt:

(9) Imdlawn Tashlihyt Berber

<table>
<thead>
<tr>
<th>Stem</th>
<th>Causative Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/s-rigigi/</td>
<td>[s-rigigi]</td>
<td>‘cause to tremble’</td>
</tr>
<tr>
<td>/s-nda/</td>
<td>[ss-nda]</td>
<td>‘churn’</td>
</tr>
<tr>
<td>/s-nza/</td>
<td>[zz-nza]</td>
<td>‘sell’</td>
</tr>
<tr>
<td>/s-ʕiʃ/</td>
<td>[šš-ʕiʃ]</td>
<td>‘cause to survive’</td>
</tr>
<tr>
<td>/s-nžm/</td>
<td>[žž-nžm]</td>
<td>‘rescue’</td>
</tr>
</tbody>
</table>

(Dell and Elmedlaoui 2002: 124)

The data in (9a,b) illustrate that without a coronal sibilant in the stem, the form of the causative prefix remains [s-] or [ss-]. However, (9c-e) illustrate that any coronal sibilant present in the verb stem will trigger complete assimilation with the causative prefix in Tashlihyt.

This same consonant harmony system is found in the Zenati Berber languages, which include the Tarifit languages of northern Morocco and the Figuig dialects of southeastern Morocco. The data in (10) below is from a Figuig dialect:

(10) Figuig (Zenati) Berber

<table>
<thead>
<tr>
<th>Stem</th>
<th>Causative Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/s-nez/</td>
<td>[zz-nez]</td>
<td>‘sell’</td>
</tr>
<tr>
<td>/s-wžed/</td>
<td>[žž-ewžed]</td>
<td>‘prepare’</td>
</tr>
<tr>
<td>/s-teš/</td>
<td>[šš-teš]</td>
<td>‘make eat’</td>
</tr>
</tbody>
</table>

(Kossmann 1997:145-7)

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5 The causative /s-/ geminates with some stems (Dell and Elmedlaoui 2002:124).
The examples in (10a-c) illustrate the same consonant harmony process as in the previous Berber languages. The causative prefix /s-/ completely assimilates to any coronal sibilant present in the following verb stem.

Thus, there is a consonant harmony process present in the Moroccan Berber languages, which have been in intense contact with Moroccan Arabic. In the next section, the consonant harmony processes in the two languages is compared.

3.2 Comparing Consonant Harmony in Moroccan Arabic and Berber

The Berber consonant harmony is similar to the Moroccan Arabic process in many respects. First, the assimilation affects adjacent and long distance segments. Secondly, the assimilation is regressive in nature. The causative morpheme is a prefix, thus the direction is only found occurring regressively, from right to left. Additionally, the target and trigger are similar to those of Moroccan Arabic. The Berber target is always the causative derivational prefix /s6/, an anterior coronal fricative. Hansson claims that the consonant harmonies in Imdlawn Tashlhiyt and Nfita Berber also have target /z/, although no examples were provided (2001: 72). Finally, the trigger in both Berber and Moroccan Arabic is a coronal fricative; however, in Berber the trigger can also be the anterior /z/ (as seen in (9c)), while in Moroccan Arabic the trigger can only be /ž/.

There are other differences between the consonant harmony in Moroccan Arabic and Berber. The most obvious one is that in Moroccan Arabic the long distance assimilation is limited to root-internal environments. On the other hand, in Berber the long distance assimilation occurs across morpheme boundaries. As shown in (11), the consonant harmony process does not occur across morpheme boundaries in non-adjacent environments:

(11) No Consonant Harmony Across Morpheme Boundaries

a. /raṣ al-žməl/ [raṣ aẓẓməl] *raš aẓ-žməl ‘the head of the camel’
   head DEF-camel

b. /nas ždad/ [nas ždad] *naš ždad ‘new people’
   people new.PL

Definite article assimilation to all coronal consonants is a phonological process present in all modern dialects of Arabic, which can be seen in (11a). When the target occurs in stem-initial position adjacent to a prefix that assimilates completely, such as /l-/ definite article, the affix takes either the consonant harmonized, or the non-harmonized consonant and assimilates to that consonant. However, this assimilation process is merely epiphenomenal of the consonant harmony process. The assimilation of the definite article to the harmonized consonant does not reflect the actual consonant harmony moving across morpheme boundaries, but rather the assimilation process occurring after the consonant harmony process. Therefore, I hold that the process is limited to root-internal contexts.

In general, there are no examples of the long distance assimilation process occurring across morpheme boundaries in Moroccan Arabic as it does in Berber. This is most likely because Moroccan Arabic lacks prefixes containing either /s/ or /z/. Yet phrases such as ‘the head of the camel’ are known as construct state constructions and can be viewed as compounding; thus, this is the most obvious place to look for the consonant harmony spreading across morpheme boundaries. Nevertheless, in these construct state contexts the consonant harmony process does not occur. Thus, in Moroccan Arabic, the process is inherently limited to root-internal conditions.

In Berber, sibilant harmony is constrained only to occur directly preceding the root (Lahrouchi 2005). The examples in (12) show that in Berber assimilation of the causative morpheme /s-/ is blocked by a reciprocal affix /m-/ (dissimilating to [n] caused by a succeeding [m]) as shown in...
(b). This process cannot cross further morpheme boundaries as the causative prefix /s-/ does not undergo consonant harmony.

(12) Tashlhiyt Berber
a. /s-həššəm/ → [ʃəhəʃəm] ‘be timid’
b. /s-m-həššəm/ → [ʃənəhəššəm] *ʃənəhəššəm ‘cause a mutual embarrassment’

(Lahrouchi 2005: 7)

Another difference can be drawn between Moroccan Arabic and Berber: in Moroccan Arabic, forms containing the harmonized consonants alternate synchronically with forms lacking harmonized consonants. Compared to Berber, the consonant harmony in Moroccan Arabic is likely to be the more recent innovation. Any historical root-internal consonant harmony in Berber would not be as obvious as the one analogous in Moroccan Arabic; there is neither synchronic alternation caused by the process, nor is there an older form of the language as extensively preserved in written form. For example, Heath states in his extensive grammar of Tamashek Tuareg (Mali), “I know of no stem that has two distinct sibilants… It may very well be that sibilant harmony is a stem-wide constraint rather than something specific to the causative suffix” (2005: 442). Furthermore, Hansson (2001) claims that in Nfita Berber the sibilant harmony also occur root-internally, but no examples were found in the literature. Thus, we assume that any historical consonant harmony process in Berber occurring in root-internal environments is no longer transparent. Crucially, the existence of free variation of harmonized and non-harmonized forms in Moroccan Arabic indicates that this process is a more recent innovation in that language. The existence of two forms in a language provides evidence that one is archaic and the other is an innovation (c.f. Labov 1994).

The difference in the properties of the two long distance assimilation processes does not discount the possibility that the process is a contact-induced change in Moroccan Arabic. Thomason argues that “contact-induced features often have different forms or different distributions or different functions from the source features in the donor language” (2001: 93). In the case of the Moroccan Arabic consonant harmony, it has both a different distribution (in Berber, the trigger can be /z/) and a different scope (root-internally vs. across morpheme boundaries) than the same process in Berber. However, the similarity in form (both regressive sibilant harmony processes), as well as the fact that there is no evidence of any consonant harmony of this nature in dialectal Arabic previous to the intense contact between the two languages, points to the conclusion that the feature has been borrowed through contact.

3.3 Consonant Harmony not Present in Moroccan Arabic before Contact with Berber

The claim that the non-harmonized forms are more conservative comes from Classical Arabic data. The data in (13) show several harmonized forms in Moroccan Arabic and the cognates of those words from Classical Arabic.

(13) Moroccan Arabic < Classical Arabic
a. /ʒəlliʒ/ < /zulayǰ/ ‘tiles’
b. /ʒaʒ/ < /zaaǰ/ ‘glass’
c. /ʒuʒ/ < /zawǰ/ ‘spouse’
d. /ʃərʒ/ < /sarǰ/ ‘saddle’

(Doniach 1982)

The Classical Arabic words provide evidence that the forms that were inherited into dialectal vernaculars occurred with the anterior alveolar preceding the palatal affricate /j/. This segment later
underwent lenition in various dialects. Scholars agree that the Classical Arabic palatal affricate was inherited into Moroccan Arabic as /ʒ/ (c.f. Heath 1987, Watson 2002). The data in (13) give evidence that the forms in (1) containing two post-alveolar consonants are innovative and a result of the assimilation process in Moroccan Arabic.

Furthermore, it is worth noting that evidence of the alternation between harmonized forms and non-harmonized forms can be seen in recent loan words from French into Moroccan Arabic. This is illustrated in the example given in (14):

(14) sažay ~ šažay  ‘to change’  < Fr. changer [šâʒɛ]

The alternation of a loanword ‘to change’ from French has been elicited from a Moroccan Arabic speaker with a non-fluent level of French. In this case, speakers are productively backforming the process from where they thought it applied. In effect, the process can be described as productive, applying to words recently borrowed into the language.

Finally, because the consonant harmony cannot be found in any other documented dialectal variety of Arabic, this process is unique and innovative in Moroccan Arabic. There is no discussion in the literature of a consonant harmony occurring in other dialects of Arabic besides Moroccan Arabic. Crucially, other North African Arabic dialects, which have not had the same level of exposure to Berber, have no consonant harmony. Several cognates of the Moroccan words shown in (1) and other words having forms that could trigger the consonant harmony were found for Algerian Arabic and Tunisian Arabic. The forms found for Algerian Arabic are shown below in (15) and the forms found for Tunisian Arabic are shown below in (16):

(15) Algerian Arabic
a. [zuuz] ~ [zuuǰ]  ‘two’
b. [sərkaǰi]  ‘Serkagi Prison’
c. [zwaaǰ]  ‘marriage’
d. [zəlliž]  ‘tiles’
e. [zwiǰa]  ‘shotgun’
f. [saadǰi]  ‘well-behaved’
g. [zǰaaǰ]  ‘glass’
h. [masjuun]  ‘imprisoned’

(Boucherit 2002)

(16) Tunisian Arabic
a. [zuuz]  ‘two’
b. [səžin]  ‘prison’
c. [nsiž]  ‘he weaved’
d. [zažlaan]  ‘sesame seeds’
e. [zəlliž]  ‘tiles’
f. [sarž]  ‘saddle’

(Ben Abdelkader and Naour 1988, Zellou elicited)

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6 Some forms were taken from an online dictionary of Algerian Dardja. While the entries were not transcribed in any linguistic notation, each entry had a sound file that could be downloaded. These transcriptions were made from the recordings of the sound files. Others were taken from Boucherit 2002. Boucherit’s data is taken from naturally occurring speech.

7 Thanks to Aymen Hachaichi for supplying me with most of these forms.
The data shown in (15) and (16) illustrate that there is no assimilation process in either Algerian Arabic or Tunisian Arabic. Two forms in these modern dialects, *zuuz* ‘two’ and *zǰaaǰ* ‘glass’, exhibit stem-internal identical consonants and deviate from the Classical Arabic forms. However, as a result of other influences in other dialects, the word ‘two’ in both dialects has probably undergone deaffrication of the final consonant so that the affricate /ǰ/ has become /ž/ (Ben Abdelkader and Naour 1988, for Tunisian). The Algerian word *zǰaaǰ* ‘glass’ could have been influenced more recently by the Moroccan form because there are two identical segments. This form does not exhibit assimilation, as the original /z/ from Classical Arabic remains present and unchanged, but rather indicates an insertion of an affricate. Nonetheless, addition of segments is not characteristic of the long distance assimilation process found in Moroccan Arabic or the Berber languages.

Ferguson’s (1959) discussion of Arabic koiné cites many phonological features common to the North African dialects of Arabic, indicating that they evolved from a similar ancient vernacular. Ferguson does not discuss consonant harmony in his work as a process that is common to Arabic vernaculars. Arising in a period when Moroccan Arabic was geographically isolated from other colloquial varieties, long distance assimilation can be viewed as a feature strikingly unique to Moroccan Arabic. Thus, the evidence clearly points to the fact that this innovation was not present in the language before the period of time where it came under heavy influence from the Berber languages of the region.

### 3.4 Consonant Harmony Present in Berber before Contact with Moroccan Arabic

Next, it must be demonstrated that a particular feature was present in the source language before the period of contact in order to support a contact-induced change hypothesis. Because the Berber language family is spread all over North Africa, non-Moroccan Berber languages can be examined for the presence of consonant harmony. If the same feature present in the Moroccan Berber languages appears in other Berber languages not in contact with Moroccan Arabic, it would support the hypothesis that this feature was present in the Berber languages before contact with dialectal Arabic (Thomason 2001).

The consonant harmony process is exhibited in both Taqbaylit (Kabyle, Algeria) Berber (17) and Tuareg (Mali) Berber (18). The examples below show that same assimilation of the causative morpheme /s-/ to coronal sibilants in the root:

(17) **Taqbaylit (Algeria) Berber**

a. /s-ønz/ [zzønz] ‘to sell’

b. /s-azzəl/ [zizzel] ‘to make run’

(Hanoteau 1906: 108)

(18) **Tamashek (Tuareg, Mali)**

a. /s-ayšad/ [šayšad] ‘waste, damage’

b. /s-ažalwaɣ/ [žažalwaɣ] ‘glare at’

(Heath 2005: 50, 440-2, 557)

The data from Taqbaylit and Tamashek Tuareg provide evidence that the consonant harmony was present in Berber before the language came into contact with Moroccan Arabic. Thus, if this feature is the result of language contact, the direction of the diffusion of this feature can be verified.
The source languages are the Berber languages of Morocco, while the receiving language is dialectal Moroccan Arabic.⁸

3.5 Look at Moroccan Arabic as a Whole for Evidence of Contact Effects from Berber

To the best knowledge of the author, while a comprehensive and methodological study has yet to be undertaken analyzing the effects of language contact in Moroccan Arabic from the Berber languages, many linguists with intimate knowledge of the linguistic area have mentioned changes in the domain of the lexicon, phonology, and morphology that have entered Moroccan Arabic from Berber (Chtatou 1997, Heath 2002, Dell and Elmedlaoui 2002). There is little doubt that contact-induced changes can be seen throughout Moroccan Arabic as a result of contact with Berber.

4. Language-Internal Hypothesis

A final step needed in order to conclude that a particular feature has been inherited through contact-induced change is to look for, and potentially rule out, plausible internal motivations for the change (Thomason 2001). While the hypothesis that the consonant harmony in Moroccan Arabic arose through language contact with the Berber languages is supported by the data, a second possible hypothesis as to the origin of this process must be investigated. This second hypothesis suggests that the long distance assimilation arose language-internally.

Evidence supporting this hypothesis comes from the comparison of the two consonant harmony systems in Moroccan Arabic and the Berber languages. Specifically, the two consonant harmony systems are different, as previously discussed extensively in section 2.2 above. However, there is also cross-linguistic evidence supporting this hypothesis.

There are several properties of the Moroccan Arabic consonant harmony that are consistent with this process arising language-internally. Evidence for this is based on Hansson’s (2001) cross-linguistic typological study of consonant harmony systems. First, the consonant harmony process in Moroccan Arabic can be classified as strictly anticipatory harmony, meaning the direction of trigger to target is from right to left (c.f. zuž~žuž and žazira *žažira from (1) and (2) above). Hansson’s survey finds that this is the most common type of directionality in consonant harmony systems (2001: 8). Second, evidence from cross-linguistic data supports the susceptibility of coronal consonants with respect to assimilation, as compared to other classes of consonants such as dorsal and labial (Frisch 1996: 11, Avery and Rice 1989). Finally, the Moroccan Arabic consonant harmony process leaves intervening vowels and non-sibilant consonants transparent and unaffected by the consonant harmony effects. The process of leaving intervening vowels and non-sibilant consonants transparent is a process typical of cross-linguistic consonant harmony systems.

Hansson states that the reason these properties are the most cross-linguistically common in consonant harmony systems is twofold. First, this type of consonant harmony has its roots in the domain of articulatory planning errors (Hansson 2001: 12). Research suggests that speech errors are highly sensitive to the similarity of surrounding segments. Specifically, segments that share various features are more likely to involve speech errors than segments that have few features in common (Frisch 1996: 50-65). Adult speech errors and consonant harmony processes have several parallels, the most prevalent being that alveolar sibilants like /s/ are often assimilated to palatals like /ʃ/. This is exemplified by English tongue-twisters such as “she sells sea shells…” whereby the coronal sibilants distinction and the right-to-left directionality are involved in the error. Furthermore, this type of

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⁸ Note that, despite Algeria being home to both Berber and Arabic speakers, Algerian Arabic does not have this same consonant harmony process. This could be due to the fact that the Kabyle Berbers are much more isolated and less integrated with Arabs than the Berber groups in Morocco.
consonant harmony can first originate in sporadic sound changes before becoming a conditioned sound change; for example Old French *cercher became Modern French chercher (Hansson 2001: 11). Second, this type of sibilant harmony is a very frequent and well-attested phenomenon in the phonological acquisition process in child language (ibid.: 166). Hansson points out further that child language consonant harmony processes are frequently partial in nature rather than total assimilations. Thus, a particular property of the consonant is assimilated while leaving other properties unaffected, for example [giŋk] for ‘drink’ where the place of articulation is assimilated while voicing and manner are unaffected (ibid.: 280-281). Further, data shows that anticipatory consonant harmony is the most predominant type in child language (Vihman 1978).

5. Multiple Causation Hypothesis

Thomason (2001: 62) broadly states that “any linguistic change that would have been less likely to occur outside a particular contact situation is due at least in part to language contact” (italics mine). She maintains that the phrase ‘at least in part’ is necessary to the definition of a contact-induced change. She points out that “the possibility of multiple causation should always be considered and… it often happens that an internal motivation combines with an external one to produce a change” (ibid.: 91).

The multiple causation hypothesis for the Moroccan Arabic consonant harmony proposes that the long distance assimilation feature originated and then was subsequently reinforced and propagated both language-internally through spontaneous speech errors and by language contact with the Moroccan Berber languages. In other words, the feature innovation in Moroccan Arabic is a result of two causes: a language-internal cause and a language-external cause working in tandem. In fact, this ‘hybrid’ hypothesis is the most satisfactory explanation of the origin of the consonant harmony process in Moroccan Arabic for several reasons.

Two reasons account for why the multiple causation hypothesis is more optimal than the two previous hypotheses mentioned, while a third reason accounts for why the multiple causation hypothesis is the most likely scenario based on the facts of the data. First, the language-external explanation – the hypothesis that this feature came into Moroccan Arabic only through contact with the Berber languages – fails to meet the necessary requirement that language-internal explanations must be disproved. Second, the language-internal hypothesis – the hypothesis that this feature arose spontaneously within the language – does not account for why this feature cannot be found in any other documented dialectal variety of Arabic. Furthermore, this hypothesis is not falsifiable. In other words, while the particular consonant harmony process in Moroccan Arabic is the most common system to arise cross-linguistically, there is no evidence available to either support or reject language-internal origins such as through adult or child speech production or perception errors.

Crucially, neither of the first two (the language-external and the language-internal) hypotheses can be disproved. Nevertheless, according to Thomason there is no reason that they are mutually exclusive hypotheses. On the contrary, there is even reason to believe these two scenarios reinforce each other: the language-external hypothesis captures the significance that this feature arose in Moroccan Arabic after years of intense contact with the Berber languages; the language-internal hypothesis provides evidence that this process is common cross-linguistically, as a by-product of articulatory planning or language acquisition phenomena. Therefore, the multiple causation hypothesis is the most optimal explanation of the long distance assimilation because it gives us a comprehensive explanation as to the origin of this feature in Moroccan Arabic.
6. Conclusion

This article investigated an innovative consonant harmony process in Moroccan Arabic. This process is exceptional for several reasons. First, no consonant harmony process of the same type exists in any documented dialect of Arabic. Crucially, there is no long distance assimilation that can be found in Algerian or Tunisian Arabic, Arabic dialects with close geographical proximity to Moroccan Arabic. Thus, this observation highlights the unique and striking nature of the consonant harmony process found in Moroccan Arabic. Second, an explanation of its origin has never been attempted. This paper aimed to advance the hypothesis that the Moroccan Arabic consonant harmony arose as a result of multiple causations; that is, language-external and language-internal factors.

The language external explanation proposes that this process came into Moroccan Arabic as a product of language contact with the Moroccan Berber languages. These two languages have been in intense contact in relative isolation for centuries. The consonant harmony process examined here closely mirrors a sibilant harmony process exhibited in the Berber languages. While there are differences in the specifics of the two assimilation processes, this dissimilarity is typical of borrowed features and does not preclude the evidence that it is a potential contact-induced innovation (Thomason 2001). Further, synchronic free variation between the harmonized forms and the non-harmonized forms suggests a more recently innovated phonological process in Moroccan Arabic. Therefore, these factors all point to the language external hypothesis as the correct one.

However, the language internal explanation for the origin on the Moroccan Arabic consonant harmony system is equally plausible. Typological evidence shows that the type of consonant harmony examined here is the most common type to arise cross-linguistically. In this scenario, regressive sibilant consonant harmony is the most prevalent type of harmony and is to some degree the most likely harmony type to develop in a language. Independent evidence from perception and production tendencies, such as adult speech errors and child phonology in language, supports an independent development of this kind.

In effect, there are two equally plausible competing scenarios for how this feature came into Moroccan Arabic. While there is no evidence that disproves either hypothesis, all the evidence points to both explanations being valid. It is not necessary that they be mutually exclusive. In fact, the definition of a contact-induced change, as given by Thomason (2001), does not rule out a language-internal cause being partially responsible. It is following this line of reasoning that we can support our final hypothesis: the multiple causation hypothesis, which states that there was a language-internal cause and a language-external hypothesis that led to this linguistic change. For instance, the fact that this process arose in Moroccan Arabic and is not found in any other North African dialect of Arabic points to the conclusion that if this innovation was caused by language-internal factors, it was reinforced through intense contact with the Moroccan Berber languages and exposure to Berber consonant harmony.
References


Mettouchi, Amina. Personal conversation.


Zellou, Georgia. (ms). Moroccan Arabic Aspect in Conversation: Multiple Pathways of Evolution of the Imperfective Arising Through Use.