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The Definite Article am- [ʔam-] of Jazani Arabic: An Autosegmental Analysis

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***Abstract*—A decent number of studies have discussed phonological or morphological aspects of the definite article in Standard or Classical Arabic. However, only a few have described the definite article in Southern Arabic dialects. Arabic consonants are divided into two categories based on how they affect the definite article al- [ʔal-]. Fourteen consonants with the [+coronal] feature cause assimilation, whereas the remaining consonants with [-coronal] do not. This process raises the question of whether this is also the case with the definite article [ʔam-] of the Southern dialect Jazani Arabic. Thus, one goal of this study was to examine whether assimilation occurs in the first place with [ʔam-]. If so, does it assimilate to consonants with specific features? Does it fully or partially assimilate to other consonants? Does directionality play a role in assimilation? Enlightened by autosegmental phonology and feature geometry, this study presents a novel dataset and a non-linear phonological analysis of Jazani [ʔam-] via linking or delinking features. Results showed that [ʔam-] completely assimilated and caused geminates when followed by [m] and partially assimilated when followed by [b] or [w] but never after [-labial] sounds. Assimilation occurred progressively or regressively based on the sonority hierarchy of the consonants. In addition, assimilation only occurred across morphological boundaries and never within one morpheme.**

***Index Terms*—autosegmental phonology, assimilation, Arabic, Jazani Arabic, Saudi Arabic**

I. Introduction

In Standard Arabic, traditional grammarians classify the consonants into two categories based on how they affect the definite prefix al- [ʔal] (Kenstowicz, 1994). One category affects al- while the other does not. Fourteen consonants are called "sun letters" because they behave in the same way as the consonant [ʃ] behaves in the word /ʔal-ʃæms/, which surfaces as [ʔaʃʃæms] "the sun," i.e., assimilating and causing the two consonants to geminate. The other consonants are referred to as "moon letters" because they behave in the same way as the consonant [l] in the word /ʔal-qamar/, which surfaces as [ʔalqamar] "the moon". In other words, they do not assimilate. The sun letters are [s, ʃ, t, d, z, r, n, l, sˤ, zˤ, θ, ðˤ, l, zˤ], and the moon letters are [f, k, h, ʔ, x, b, m, h, w, j, ʕ, ʁ, dʒ] (Alfozan, 1989). Briefly, this assimilation process only occurs when [l] in [ʔal-] is followed by a sound that shares a coronal feature with [l].

Unlike Standard Arabic, Jazani Arabic has [ʔam] as the definite article instead of [ʔal]. While lexically the same, phonologically, these definite articles contain different segments, /l/ and /m/, and thus potentially have different analyses. As mentioned above, [l] in [ʔal-] assimilates to the following sound if it has a coronal feature. Based on this analysis, one can initially predict that [m] in [ʔam-] will assimilate to the following sound if it shares the labial feature with [m] but not coronal or dorsal consonants. This generalization also predicts that there should be a gemination pattern similar to that of [ʔal], meaning a complete assimilation might be observed. This study sought to examine whether assimilation occurred under this generalization, and if so, whether [ʔam-] showed complete or partial assimilation. The researcher tested these speculations by using the Jazani definite article [ʔam-] followed by words beginning with any of the labial sounds available in Jazani Arabic.

To understand this assimilation process, the concept of assimilation, autosegmental phonology, and feature geometry are explained in the literature review.

The Current Study

The purpose of this study was to investigate the assimilation process in Jazani Arabic, a dialect spoken in the Southern region of Saudi Arabia. The study has aimed to provide a novel dataset, present an autosegmental analysis of the definite article [ʔam-] of Jazani Arabic, and compare its patterns to that of Standard Arabic, highlighting any similarities or differences. The significance of the current study lies in the paucity of non-linear phonological analyses of this definite article, which has not been discussed before.

II. Literature Review

A. Assimilation, Gemination, and Autosegmental Phonology

Assimilation describes how a segment becomes similar to an adjacent segment by taking on features of that segment (Chomsky & Halle, 1968). It occurs when two sounds share a common feature in place or manner of articulation (Dawood & Atawneh, 2015). Assimilation occurs either within a word or across word boundaries (Roach, 2009). It

usually occurs in casual and rapid speech and is less likely in slow and careful speech (Roach, 2009). There are various manners of assimilation, which include progressive, regressive, and coalescent assimilation (Gimson, 2001), and forms of assimilation, which include complete or full assimilation (Ladefoged & Johnson, 2014) and partial assimilation (Padgett, 1995; Lin, 2002).

Autosegmental phonology developed a completely distinct understanding of assimilatory processes (Goldsmith, 1976). In autosegmental phonology, assimilation is explained as a spreading rule (Hayes, 1986). According to this framework, each segment is associated or linked by association lines to its separate layer or tier (Goldsmith, 1976). The spreading rule adds more association lines, which increases the domain of the segments but also sometimes deletes or delinks features/segments. In different words, assimilation can be expressed without the use of interdependent variables and instead by assigning the assimilating features to a distinct autosegmental layer or tier of representation. The pertinent features or set of features merely broaden its domain to encompass the components undergoing the assimilation process (Pulleyblank, 1995). Before demonstrating how assimilation occurs, it is important to discuss gemination.

In the literature, geminate consonants are represented either as a long consonant or two sequences of a consonant, phonemically contrasting with singleton consonants in terms of segmental duration. In these cases, the realization of the phonetic length of a segment as a singleton or geminate is contrastively important to distinguish lexical items. Geminate consonants can thus be viewed as two identical consonants that occur one after another to cause longer closure duration (Trubetzkoy, 1969; Catford, 1977). In the syllable structure, the first segment of the two-consonant sequence is in the coda of the first syllable, and the second segment is in the onset of the second syllable. Moreover, a geminate consonant is a sequence of two consonants that usually have the same place and manner of articulation (Delattre, 1971). There are two types of geminate consonants: true geminates and fake geminates. A true geminate occurs in a single morpheme, while a fake geminate occurs across morpheme boundaries, namely due to the melodic segment created by the two segments at the morpheme boundary (Hayes, 1986). A true geminate is doubly linked, as represented in (1a), while fake geminates are singly linked, as in (1b).

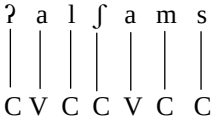
1a.

1b.

(Hayes, 1986)

Equipped with these concepts, complete assimilation of the Arabic definite al- [ʔal] prefix can be explained as a spreading of the following coronal segment node to the [l] C-place node after delinking it from its coronal. Therefore, [l] in [ʔal] becomes [ʃ] before a word that initially begins with [ʃ], as in [ʃams]. When the definite article is combined with this word, the word's underlying representation is /ʔal-ʃams/ and surfaces as [ʔaʃʃams] (Kenstowicz, 1994). The outcome of this assimilation rule results in a geminate consonant. Thus, the autosegmental underlying representation can be expressed as in (2a) and the surface representation as in (2b).

2a.



2b.

segmental tier

CV tier

B. Arabic Consonants

Arabic is a Semitic language with a limited vocalic system, containing only /a/, /i/, and /u/, but an extensive consonantal system, including 28 consonants, 14 of which are categorized as sun letters and the remaining as moon letters. As mentioned above, this assimilation process is only applicable to sun letters. Table 1 illustrates these two categories.

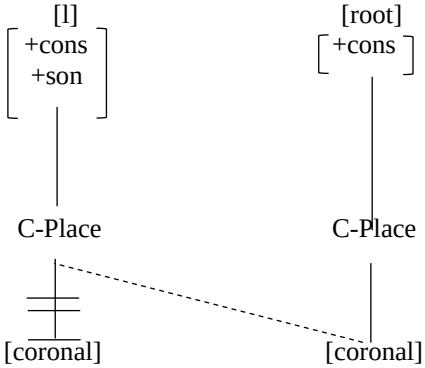
TABLE 1
CLASSIFICATION OF ARABIC CONSONANTS (ADAPTED FROM KAMBUZIYA, 2007)

Sun letters (coronal)	Surface representation	Gloss	Moon letters (non-coronal)	Surface representation	Gloss
/ʔal-ʃæms/	[ʔaʃʃæms]	The sun	/ʔal-qæmær/	[ʔalqæmær]	The moon
/ʔal-sænæh/	[ʔassænæh]	The year	/ʔal-færæs/	[ʔalfæræs]	The mare
/ʔal-zæit/	[ʔazzæit]	The oil	/ʔal-kitæ:b/	[ʔalkitæ:b]	The book
/ʔal-næhr/	[ʔannæhr]	The river	/ʔal-hærf/	[ʔalhærf]	The letter
/ʔal-dæ:r/	[ʔaddæ:r]	The house	/ʔal-ʔæb/	[ʔalʔæb]	The father
/ʔal-θæwb/	[ʔaθθæwb]	The garment	/ʔal-xæ:tæm/	[ʔalxæ:tæm]	The ring
/ʔal- rædʒul/	[ʔarrædʒul]	The man	/ʔal-bæ:b/	[ʔalbæ:b]	The gate
/ʔal-tidʒæ:ræ/	[ʔattidʒæ:ræ]	The commerce	/ʔal-mæwt/	[ʔalmæwt]	The death
/ʔal-læbæn/	[ʔallæbæn]	The milk	/ʔal-hæræb/	[ʔalhæræb]	The escape
/ʔasl-sˤaif/	[ʔasˤsˤaif]	The summer	/ʔal-wælæd/	[ʔalwælæd]	The boy
/ʔal-ðˤæ:lim/	[ʔaðˤðˤæ:lim]	The cruel	/ʔal-jæwm/	[ʔaljæwm]	The day/today
/ʔal-tˤi:n/	[ʔatˤtˤi:n]	The mud	/ʔal-ʕæ:lim/	[ʔalʕæ:lim]	The scientist
/ʔal-zˤæʕf/	[ʔazˤzˤæʕf]	The weakness	/ʔal-ʁæ:r/	[ʔalʁæ:r]	The cave
/ʔal- ðælɢ/	[ʔa ððælɢ]	The tip of the tongue	/ʔal-dʒæbæl/	[ʔaldʒæbæl]	The mountain

C. Feature Geometry

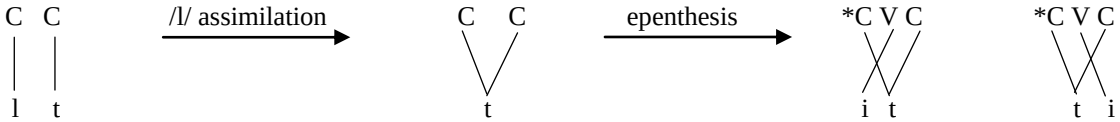
The autosegmental representation by itself is not enough to explain how assimilation occurs. It is important to know how and in what cases the spreading rule applies. In other words, the question that arises is what common feature exists between the [l] in [ʔal] and the following consonant that causes [l] to assimilate. Some researchers have discussed this assimilation rule in the frame of feature geometry (Clements & Hume, 1995). Many researchers have adopted autosegmental phonology to analyze assimilation as a spreading rule and feature geometry to show what features are spreading based on the organization of feature grouping. Kambuziya (2007) and Youssef (2013) proposed that the /l/ is [+coronal] and shares the same feature with all consonants it assimilates to. To clarify, the [+coronal] feature of the segment following the [l] spreads to the C-place node of [l] after it delinks from its coronal node. The definite article [ʔal] assimilation rule is represented in (3).

3. [ʔal-] Assimilation Rule in Classical Arabic



This assimilation spreading rule illustrates that the segment following [l] in the definite article [ʔal-] spreads the coronal feature of that segment to the C-place of [l], making this an instance of complete assimilation. The assimilation rule in (3) only applies to segments with a coronal feature. If the sound following [l] is dorsal or labial, [l] does not assimilate to that sound. For instance, if the word /færæs/ "mare" comes after the definite article [ʔal-], [l] will not assimilate to [f] because [f] is labial, not coronal, so the word surfaces as [ʔalfæræs]. Likewise, if /kitæ:b/ "book" follows [ʔal-], [l] will not assimilate to [k] because [k] is dorsal, so the word surfaces as [ʔalkitæ:b]. The complete assimilation spreading rule in Classical Arabic is a regressive assimilation rule, as seen in (3), where the coronal node spreads leftward. The assimilation rule results in a geminate consonant that is doubly linked, meaning it is a true geminate. Abu-Salim (1980) argued that geminates resulting from the assimilation rule can be described as "true" or "fake" geminates by testing them with /i/ epenthesis. Abu-Salim contended that true geminates cannot be separated by epenthesis. Therefore, he proposed the derivation in (4).

4.



With this background on the assimilation of [l] in [ʔal-] in Standard Arabic, the question that arises is whether the abovementioned assimilation rule applies to the definite article [ʔam-] that ends with [m], and if so, in what environment. Should we expect to see the same pattern of assimilation and gemination with labial sounds since [m] is a labial sound? The next sections present, analyze, and discuss whether the assimilation process is applicable to the definite article am- [ʔam-] in Jazani Arabic, and if so, how the rule might be applicable.

III. Methodology

The Current Study Data

The Jazani Arabic definite article am- [ʔam-] is the same as the Standard Arabic article al- [ʔal-] in terms of lexical function, meaning that both [ʔam-] and [ʔal-]- are equally used as definite articles behaving like the English definite article "the." The data in the literature could be used, to some extent, with the Jazani Arabic definite article, namely the data mentioned above from Kambuziya (2007). However, due to lexical differences between Standard Arabic and Jazani Arabic, the researcher, a native Jazani speaker, has provided new data for the purpose of the current study.

Phonologically, these two articles function differently and have different analyses. As noted above, to say "the sun" in Standard Arabic, the article [ʔal-] has to be added to /ʃæms/ "sun," producing [ʔaʃʃæms], with [l] assimilating to the following sound [ʃ] and causing gemination. In Jazani Arabic, the prefix am- [ʔam] will not change the meaning, but the gemination of [ʃʃ] resulting from the [l] assimilation in Standard Arabic is not attested with the use of [ʔam-], so the word will be pronounced [ʔamʃams] in slow and careful speech and [mʃams] in casual and rapid speech. It also does not assimilate to velar consonants like [g], so /ʔam-gamar/ is realized as [ʔamgamar] or [mgamar]. This pattern is further illustrated in Table 2.

TABLE 2
/ʔAM/ WITH CORONAL AND DORSAL WORDS

Sun letters	Surface representation	Gloss	Moon letters	Surface representation	Gloss
/ʔam-ʃams/	[mʃams]	The sun	/ʔam-gamar/	[mgamar]	The moon
/ʔam-samak/	[msamak]	The fish	/ʔam-kitæb/	[mkitæb]	The book
/ʔam-zait/	[mzait]	The oil	/ʔam-ħaʒdar/	[mħaʒdar]	The stone
/ʔam-nar/	[mnar]	The fire	/ʔam-ʔarnab/	[mʔarnab]	The rabbit
/ʔam-deek/	[mdeek]	The rooster	/ʔam-xæ:tam/	[ʔam-xæ:tam]	The ring
/ʔam-θob/	[mθob]	The robe	/ʔam-hail/	[mhail]	The cardamom
/ʔam- rudʒul/	[mrudʒul]	The man	/ʔam-jad/	[mjad]	The hand
/ʔam-tamr/	[mtamr]	The dates	/ʔam-ʕalam/	[mʕalam]	The flag
/ʔam-laban/	[mlaban]	The buttermilk	/ʔam-ɣʊrfah/	[mɣʊrfah]	The room
/ʔam-sˁuba/	[msˁuba]	The boy	/ʔam-dʒɪsɪr/	[mdʒɪsɪr]	The bridge
/ʔam-ðˁaama/	[mðˁaama]	The thirst			
/ʔam-tˁawlah/	[mtˁawlah]	The table			
/ʔam- ðorah/	[m ðorah]	The corn			

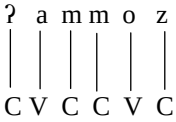
While it is clear from the examples in Table 2 that assimilation of [m] in [ʔam-] does not occur with the following coronal and dorsal consonants, it is unclear whether assimilation occurs with labial consonants. The generalization predicts that the Jazani Arabic definite article [ʔam-] may show complete assimilation and gemination before [m], similar to that of [ʔal] before [l], and partial assimilation with other labial sounds. Therefore, to avoid redundancy, data pertaining to all labial sounds are provided and discussed in the next sections.

IV. DISCUSSION

A. [ʔam-] With the Voiced Bilabial /m/

When the Jazani Arabic definite article [ʔam-] is followed by a word that begins with /m/, the two /m/ consonants result in gemination. For instance, when the article [ʔam-] is followed by the word /moz/ "bananas," gemination occurs in /ʔammoz/, which surfaces as [mmoz] "the bananas." However, instead of stating that the gemination resulted from spreading and delinking rules, as this would sound redundant, a simpler statement would be that phonetically, a sequence of two labial sounds, in this case [m], resulted in a geminate consonant. In an autosegmental analysis, this can be represented as either two sequences of /m/, each of which is linked to a single C tier, as represented in (5a), or doubly linked, as represented in (5b).

5a.



5b.

segmental tier

CV tier

Both representations phonetically ensure that the surface of this word has a gemination of the consonant /m/. However, according to Hayes (1986), the representation in (5a) expresses a fake geminate, while the representation in (5b) expresses a true geminate. Abu-Salim (1980) argued that the geminate sounds that resulted from [l] assimilation in Standard Arabic were true geminates, proposing that this geminate could not be separated by epenthesis. Similarly, I propose that geminates in Jazani Arabic that have resulted from a sequence of two consonants are also true geminates. Any attempt to break up this gemination with epenthesis results in the wrong surface representation. For instance, if the geminate sound /mm/ in the word [ʔammoz] "the bananas" is separated by /i/, this epenthesis results in the wrong surface representation: *[ʔamimoz]. However, (5a) violates the Obligatory Contour Principle, which states that adjacent identical segments are not allowed. Thus, tier conflation is needed (McCarthy, 1986), in which morphemes are on a separate tier, producing (5b). Table 3 provides a sample of data exhibiting the geminate sounds that occur due to a sequence of two instances of [m].

TABLE 3
/ʔAM/ WITH LABIAL /M/ WORDS

ʔam + m	Surface representation	Gloss
/ʔam-mɪftaħ/	[mmɪftaħ]	The key
/ʔam-moz/	[mmoz]	The bananas
/ʔam-malaf/	[mmalaf]	The file
/ʔam-mabna/	[mmabna]	The building
/ʔam-mʊx /	[mmʊx]	The brain

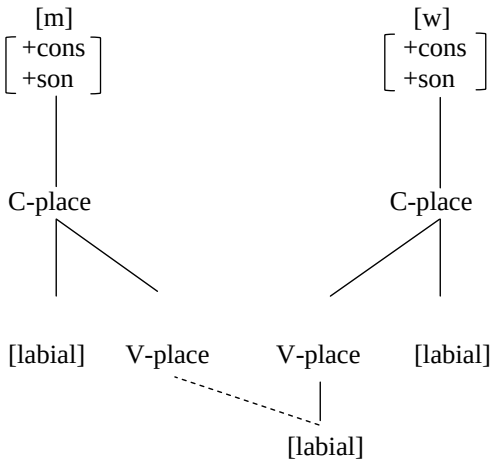
Another question is whether the same results are apparent if the following word begins with /w/. In other words, will [m] assimilate to /w/? Therefore, the next section provides examples of words that begin with /w/ and presents an autosegmental analysis to demonstrate any phonological processes.

B. [ʔam-] With the Voiced Labio-Velar /w/

In the case of /w/, when [ʔam-] is followed by a word that starts with /w/, a complete assimilation or gemination does

not occur. Instead, the labial or rounding feature spreads from the labio-velar /w/ to [m] in the definite article [ʔam-], which results in a labialized bilabial nasal sound [mʷ]. For instance, when the word /walad/ "boy" follows the definite article [ʔam-], the pronunciation of [m] in the article surfaces as [mʷwalad] "the boy". Unlike the assimilation in Standard Arabic, this is partial rather than complete assimilation, spreading only the labial feature from the [w] labial node to the V-place node of [m] and not spreading to the C-place. Speaking of feature spreading direction, this process is a regressive assimilation rule, spreading leftward just like the assimilation in Standard Arabic. The labialization spreading rule is represented in (6).

6.



It is important to emphasize that the assimilation rule in (6) only applies to labial sounds. In other words, if someone assumes that /w/ is a glide and /j/ is a glide as well, then a palatalization assimilation rule is expected. For example, if there is a word that begins with /j/, the [m] in [ʔam-] presumably surfaces as [mʲ]. Whether that is the case or not, it is beyond the scope of the current study, a topic I leave for future research. Instead, this rule is restricted to the labio-velar sound /w/. Thus, the [labial] feature is specified in the assimilation rule. Table 4 provides a sample of data exhibiting the labialization or rounding of /m/ in Jazani Arabic.

TABLE 4
/ʔAM/ WITH LABIAL /W/ WORDS

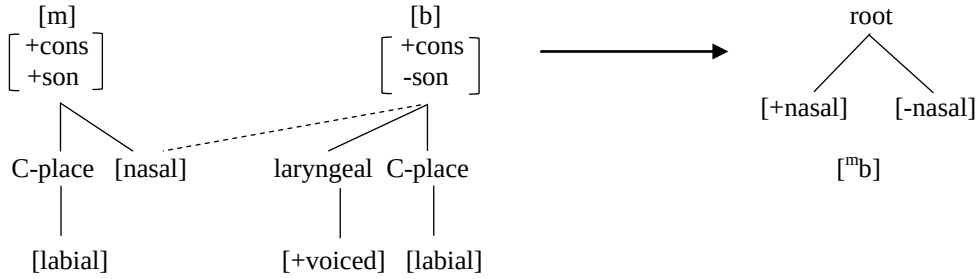
ʔam + w	Surface representation	Gloss
/ʔamʷward/	[mʷward]	The roses
/ʔamʷwalaʕah/	[mʷwallaʕah]	The lighter
/ʔamʷwadi/	[mʷwadi]	The valley
/ʔamʷwaragah/	[mʷwaragah]	The paper
/ʔamʷwarʃah/	[mʷwarʃah]	The workshop

However, if the following word begins with /b/, it is unclear from the data above whether there would be partial or complete assimilation. Will [m] assimilate to /b/, producing a sequence of two [b] sounds like with [m]; will [m] partially assimilate to [b], like with [w]; or will a new pattern be attested? The next section provides examples of words that begin with /b/ and presents an autosegmental analysis to demonstrate any phonological processes in this regard.

C. [ʔam-] With the Voiced Bilabial /b/

In the case of /b/, when [ʔam-] is followed by a word that begins with /b/, a complete assimilation or gemination does not occur; instead, partial assimilation occurs. Unlike the previous assimilation rule, in which [ʔam-] is followed by a word with initial /b/, [m] is the segment that spreads a feature. It spreads the [nasal] feature to the following sound, namely to the voiced bilabial /b/ for the moment. For example, if the word /bæ:b/ "door" followed the article [ʔam-], the representation of this word would be realized as [ᵐbæ:b] "the door". The assimilation spreading rule is represented in (7).

7.



This assimilation spreading rule illustrates that only the [nasal] feature of the sound [m] spreads to the following

segment [b] to become a prenasalized sound [ᵐb]. This is similar to the previous assimilation rule in terms of spreading only partial features and unlike the assimilation in Standard Arabic, which was an example of complete assimilation. In addition, unlike both the labialization assimilation rule and the C-place assimilation rule in Standard Arabic, this rule involves progressive assimilation, spreading rightward from the /m/ in the definite article [ʔam-] to the following segment, in this case the voiced bilabial /b/. It is important to ensure that the rule in (7) results in a prenasalized sound [ᵐb] and eliminates other predictions like [mb], proposing that the segment has two parts, just like affricate representations, but this segment has [+nasal] and [-nasal], as illustrated above. Cross-linguistically, prenasalized sounds in some African languages function as a single segment and so are represented as an underlying nasal + obstruent sequence across morpheme boundaries, which is remarkably similar to the case of Jazani Arabic (Odden, 1996). Table 5 provides a sample of data showing the prenasalized labial sound [ᵐb].

TABLE 5
/ʔAM/ WITH LABIAL /B/ WORDS

ʔam + b	Surface representation	Gloss
/ʔamᵐbortuqal/	[mᵐbortuqal]	The oranges
/ʔamᵐbatˁah/	[mᵐbatˁah]	The duck
/ʔamᵐbent/	[mᵐbent]	The girl
/ʔamᵐbaiðˁ/	[mᵐbaiðˁ]	The egg
/ʔamᵐbatˁriq/	[mᵐbatˁriq]	The penguin

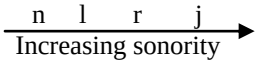
With respect to nasal feature spreading, one might wonder whether this assimilation rule applies to other labial sounds in the language, such as /f/. The assimilation rule above is clear; the nasal feature only spreads to a sound that is [+voiced]. Furthermore, these two assimilation rules show a difference in the directionality of spreading, a point discussed below.

D. Directionality and Sonority Hierarchy

With the assimilation rules established for Jazani Arabic, similarities and differences were noticed with the assimilation rule in Standard Arabic. The first difference is that Standard Arabic has a complete assimilation rule, while Jazani Arabic has partial assimilation. The second difference is that the spreading rule in Standard Arabic is regressive assimilation, while in Jazani Arabic the labialization assimilation rule is regressive, and the nasality-spreading rule is progressive. Therefore, the question that arises is what causes the directionality in the spreading rules in Jazani Arabic. To answer this question, it is necessary to look at sonority hierarchy concepts regarding assimilation.

Heselwood (2011) proposed that assimilation rules followed the sonority hierarchy, claiming that the less sonorous sound assimilated to the more sonorous sound, as in (8).

8.



Based on this sonority hierarchy, Heselwood (2011) assumed that /n/ assimilated to /l/, /l/ to /r/, and /r/ to /j/ but not vice versa. However, many languages show the opposite trend, and some do not follow the hierarchy at all. For instance, Lebanese Arabic follows the sonority hierarchy. The prefix /b/, a less sonorous segment, assimilates to the following nasal /n/, a more sonorous segment. Therefore, the word /bnaakul/ surfaces as [mnaakul] "we eat".

Other languages do not follow the sonority hierarchy. In Diola, a West African language, a segment only assimilates to another segment with less or equal sonority. For example, in the word /ni-gam-gam/, the more sonorous sound /m/ assimilates to the less sonorous sound /g/, and the word surfaces as [nigaŋgam] "I judge". As another example, in /ku-bon-bon/, the more sonorous sound /n/ assimilates to the less sonorous sound /b/, so the word surfaces as [kubombon] "they sent" (Sapir, 2011).

In Standard Arabic, on the other hand, the [l] in the definite article [ʔal-] assimilates to the following coronal sound irrespective of sonority. For instance, it has been observed that [l] assimilates to a more sonorous sound like /r/ in /ʔal-rædʒul/, which is realized as [ʔarrædʒul]. Moreover, [l] assimilates to less sonorous sounds like [ʃ], [s], and [z]. For instance, when the definite article precedes the words [ʃæms] "sun," [sænæh] "year," and [zait] "oil," the [l] assimilates to [ʃ], [s], and [z], respectively, so the words surface as [ʔaʃʃæms] "the sun," [ʔassænah] "the year," and [ʔazzait] "the oil" (Youssef, 2013).

With that in mind, framing the assimilation rules in Jazani Arabic in terms of the sonority hierarchy can help determine the directionality of the spreading rules. In Jazani Arabic, the less sonorous sound assimilates to the more sonorous sound. In other words, the more sonorous sound spreads a feature to the less sonorous sound. To clarify, in the labialization rule, the more sonorous sound [w] spreads [+rounding] to the less sonorous sound, in this case [m]. In the nasal feature spreading rule, the more sonorous [m] spreads the nasal feature to the less sonorous [b]. This explanation accounts for the leftward or rightward directionality of the spreading rules in Jazani Arabic. After observing these assimilation rules in Jazani Arabic and how the sonority hierarchy is related to the directionality in spreading, the study addresses whether these rules are phonetic or phonological.

E. Is Assimilation in Jazani Arabic Phonetic or Phonological?

Because phonetics and phonology have some interaction and overlap, the rules discussed in the previous sections

could be seen as belonging to one area or the other. However, if the rules apply everywhere, one can say that the rules are general and thus are phonetic rules. If the rules are only applicable in certain contexts, one can claim that the rules are phonological. As mentioned before, the place assimilation rule in Standard Arabic only occurs across morpheme boundaries, but the assimilation rules in Jazani Arabic have not previously been established.

(a). Morpheme Boundary

One question here is whether the assimilation rules for [ʔam-] in Jazani Arabic are restricted to a morpheme boundary. Other Arabic morphemes that end with [m] followed by words that begin with [m] can be used to test whether gemination occurs due to a sequence of two instances of /m/. In Standard Arabic, for example, the plural object pronoun /hum/ "them" is attached to verbs. When this pronoun is attached to the verb /kallama/ "call," it becomes [kallamahum]. If this form is followed by a noun that begins with /m/ like /muħamməd/, the result is [kallamahum muħaməd] "Mohammed called them". That is, the /m/ in the pronoun and the /m/ in the following noun do not geminate, as in the case when the Jazani Arabic definite article [ʔam-] is followed by a noun that starts with /m/. Therefore, one can conclude that [m] gemination cannot occur with other morphemes that have /m/, and this gemination is restricted to [ʔam-] in terms of morpheme boundaries.

(b). Word Boundary

In addition to /m/ gemination not occurring with morphemes other than [ʔam-] across morpheme boundaries, this gemination pattern does not occur across word boundaries either. If a word that ends with /m/ was followed by any other labial sound investigated in the earlier sections, e.g., /m, b, w/, none of the assimilation rules would apply. For example, if the word /galam/ "pen" is followed by the name /walid/, the labialization spreading rule does not occur, so the phrase will surface as [galam walid] "Waleed's pen". Table 6 provides more data showing that none of the assimilation rules apply across word boundaries.

TABLE 6
ASSIMILATION ACROSS WORD BOUNDARIES

Word boundary	Expected rule	Surface representation	Gloss
ʕalam# #masˤr	[mm]	[ʕalam masˤr]	Egypt's flag
gasem# #muʃtark	[mm]	[gasem muʃtark]	Common denominator
tˤagem# #worud	[mʷ]	[tˤagem worud]	Set of roses
film# #waħed	[mʷ]	[film waħed]	One movie
kɒllɒhɒm# # barra	[ᵐb]	[kɒllɒhɒm barra]	All of them are outside
xatem# #bader	[ᵐb]	[xatem bader]	Bader's ring

Based on the data in Table 6, it can be proposed that assimilation rules in Jazani Arabic are restricted to the definite article [ʔam-]. With that said, the question of whether the assimilation rules in Jazani Arabic are phonetic or phonological can now be answered. If the rules are phonetic in nature, the assimilation rules should apply across other morpheme boundaries and word boundaries. However, the rules are not applicable everywhere in all contexts but are rather restricted to the specific morpheme boundary in which [ʔam] occurs. Thus, I can generalize that [ʔam-] assimilation rules are morpho-phonologically driven. This is an example of a derived environment effect (Mascaró, 1976; Kiparsky, 1993; Kager, 1999). Similarly, in Terena, an Arawakan language in Brazil, the prenasalization of consonants is derived by a morphological rule. In this language, the first singular pronoun is represented in the [nasal] feature that is aligned to the left edge and then spreads rightward. For instance, the word /piho/ is realized [mbiho] "went," which indicates that this is driven by a morphological rule (Cole & Kisseberth, 1995). In the following section, I review the main points of this study and its contributions.

V. CONCLUSION

This discussion on the Jazani Arabic definite article [ʔam-] and Standard Arabic definite article [ʔal-] has revealed similarities and differences between the assimilation rules in these dialects. Both the [m] in [ʔam-] and [l] in [ʔal-] showed assimilation rules based on the following sound's features. That is, Jazani Arabic showed assimilation with the following labial sounds because [m] is a labial sound, while Standard Arabic showed assimilation with the following coronal sounds because [l] is a coronal sound.

In terms of differences, Standard Arabic showed a complete place assimilation rule, while Jazani Arabic had partial assimilation rules. Another observed difference was that Standard Arabic had a regressive spreading rule, whereas in Jazani Arabic both regressive and progressive assimilation rules were attested. The directionality of the spreading was explained by the sonority hierarchy. The assimilation process in Jazani Arabic showed that less sonorous sounds assimilated to more sonorous sounds. In contrast, Standard Arabic appeared to apply assimilation irrespective of sonority hierarchy, so [l] could assimilate to less sonorous as well as more sonorous sounds.

Many studies have examined the Standard Arabic definite article [ʔal-], but few have discussed some linguistic aspects of [ʔam-] and none have discussed the phonological aspects of [ʔam-]. Therefore, the contribution of this paper is to provide a phonological analysis of the Jazani Arabic definite article [ʔam-] using an autosegmental phonology and feature geometry framework, which had not been accomplished in prior research.

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