

Assimilation in Jerash Fallaahi Dialect: A Non –Linear Analysis

Muneera Mohammad Jaradat*
Prof. Radwan Salem Mahadin**

Received 25/6/2017

Accepted 10/8/2017

Abstract:

The study aims to investigate the phonological assimilation processes which are manifested in Jerash Fallaahi Dialect (JFD), a rural Jordanian dialect spoken in the north of Jordan by 120,000 people. The study uses non-linear approaches, namely, the autosegmental and the feature geometry approaches to analyze the phonological assimilation processes because of their adequacy in representing these processes in a clear way. The data are collected by recording spontaneous conversations of twenty subjects of Jerash Fallaahi people who are native speakers of this dialect. The analysis shows that JFD displays four types of assimilation: First, emphasis assimilation in which the infix dental stop /-t-/ is realized as a dental emphatic [-T-] when it is preceded by an emphatic segment. Second, voice assimilation which occurs between the coda and the onset when they are coronal obstruents, velars, or pharyngeals of two adjacent words. Third, nasal homorganic assimilation in which the nasal /n/ adapts the place of articulation of the following consonant. Finally, total assimilation which produces identical segments exhibits between the definite article and the coronal consonants, in the detransitivizing prefix /t-/ with measure V and measure VI verbs, and when the consonant /h/ of the nominal/ genitive third person dependent pronoun is deleted when it is suffixed to a voiceless obstruent-final word.

Key Words: Jerash dialect, non-linear analysis, assimilation, emphasis, nasal homorganic.

تحليل لا خطي للتماثل الصوتي في اللهجة الفلاحية الجرشية

منيرة محمد جرادات*

أ.د. رضوان سالم محادين**

ملخص:

تهدف هذه الدراسة الى تحليل عمليات التماثل الصوتي في اللهجة الفلاحية في جرش في شمال الاردن والتي يتحدثها قرابة المائة و العشرون الف شخص. تستخدم هذه المقالة المنهج اللاخطي من اجل تحليل هذه العمليات وبالتحديد التحليل الاحادي والتحليل الهندسي للاصوات. و قد تم جمع البيانات من خلال تسجيلات صوتية لعشرين شخص من المتحدثين للهجة بطريقة عفوية اثناء الحديث في مواضيع مختلفة. ويظهر التحليل أن اللهجة الجرشية تحتوي على اربعة انواع من التماثل الصوتي: اولاً: التماثل الصوتي المفخم والذي ينتج بسبب وجود احد اصوات التقخيم في الكلمة. ثانياً: التماثل بين الاصوات المجهورة والاصوات غير المجهورة عندما يكونان في كلمتين متجاورتين. ثالثاً: التماثل الصوتي الادغامى، حيث يدغم حرف "النون" مع الاحرف المجاورة له في المكان و يتغير ليصبح صوت اخر. و اخيراً: التماثل الصوتي الكلي والذي ينتج عنه تماثل كامل بين الصوتين، كما هو الحال بين ال التعريف وبين الاصوات التاجية، بين الاصوات التاجية في افعال الوزن الخامس والسادس و التاء المضافة لهما و اخيراً يحدث التماثل الكلي بين الاصوات الصامتة في نهايات الكلمات والضمائر التي تبدأ بصوت "الهاء".

* جامعة العلوم والتكنولوجيا الأردنية
** كلية اللغات الأجنبية/ الجامعة الأردنية

Introduction:

Assimilation is a common phonological process of a sound change by which a sound becomes similar to a nearby sound. Assimilation of sounds can occur within a word or cross word boundary. The sounds undergo a change in one or more features in order to assimilate to other sounds in their environment. It varies in extent according to speaking rate and style; it is common in rapid and casual speech and less in careful and slow speech.

Katamba (1989) indicates that assimilation can be described as the modification of a sound in order to make it more similar to some other sound in its neighborhood, with a purpose of making a sound smoother, and more effortless. He also points out that the major motivation of the process of assimilation is the ease of articulation. Therefore, the two adjacent sounds become similar or identical which simplifies the task of articulation and avoids changing the position of the speech organs in a short period of time. In addition, Carr (1993:38) states that: "Assimilation is a phonological process that generally results from morpheme concatenation." Concatenation of morphemes involves the addition of an affix to a base form. As a result, certain sounds become adjacent to each other and often one of these sounds influences the other in its pronunciation.

Watson (2002:214) points out that "assimilation tends to adhere to the notion of dominance. Where X overrides Y, X can be said to be dominant with respect to Y". She indicates that certain phonological features are more dominant than others. For instance, [sonorant] is a weak feature, and the target of assimilation is usually the more sonorous consonant. Conversely, the trigger is the less sonorant consonant, and sonorants rarely trigger assimilation. For example, in San'ani and Cairene Arabic nasal place assimilation, /n/ acquires the place features of a following obstruent within the phonological word, but rarely the place features of a following palatal or labio-velar glide. Hence, the San'ani word /yinbaʕ/ 'he jumps' is realized as /yi[m]baʕ/, but the word /yinwi:/ 'he intends' is usually realized as /yi[n]wi:/ without the nasal assimilation process. She explains that place features are not of equal strength; oral consonants are dominant in regard to non-oral consonants.

Furthermore, phonological assimilation processes have been investigated by several phonological theories. In the phonological theory of **The Sound Pattern of English** SPE (Chomsky and Halle, 1968), the phonological assimilation process is defined as a feature changing rule; one segment is changed in its feature values so as to become more similar to a

nearby segment. However, in the non-linear approaches, such as the autosegmental and the feature geometry, assimilation is considered as a spreading rule, that associates the temporal domain of the autosegments and the features by adding association lines, often deleting displaced autosegments and features in the process. In the Optimality Theory (OT), it is viewed as the competition between Faithfulness and Markedness constraints for both articulatory and perceptual constraints, see (Jun, 2005).

In general, assimilation can be classified in terms of directionality and in terms of the degree of similarity. Taking the direction of assimilation into account, assimilation is generally classified into: regressive, progressive, and reciprocal (mutual) assimilation. In addition, assimilation has several types, such as emphasis assimilation, voice assimilation, place assimilation, and total assimilation.

The purpose of this study is to investigate the types of assimilation which are manifested in Jerash Fallaahi Dialect (henceforth JFD) by applying two of the non-linear approaches, namely, the autosegmental and the feature geometry approaches because they are best in representing the assimilation processes in an obvious way. JFD is a rural Jordanian dialect, spoken in the city of Jerash in the north of Jordan by almost 120,000 people.

Method and Data:

To investigate the types of the phonological assimilation in JFD, the researchers collected data from the recordings of the conversations and the dialogues from twenty subjects of Jerash Fallaahi people who are native speakers of this dialect. This source is obtained by the researchers themselves. Given that the nature of this study is a descriptive and a qualitative one, the purposive sampling technique is thus the most appropriate one because it gives the researchers the needed control on their sample to meet the nature and the objective of the study. The twenty subjects selected as the sample of this study represent the various demographic factors such as gender, age, marital status, level of education, and occupation. The following table summarizes the demographic distribution of the study's subjects:

Table (1): The Demographic Distribution of the Study's Subjects in Jerash

subjects	Gender	Age	marital status	Education	occupation
1	male	28	married	graduate	civil servant
2	female	50	married	no formal education	house wife
3	male	65	married	primary school	retired soldier
4	male	55	married	primary school	farmer

subjects	Gender	Age	marital status	Education	occupation
5	female	35	unmarried	graduate	teacher
6	female	62	married	no formal education	house wife
7	male	35	married	graduate	teacher
8	male	62	married	graduate	retired civil servant
9	female	40	married	secondary school	unemployed
10	male	58	married	no formal education	farmer
11	male	25	unmarried	graduate	unemployed
12	female	50	married	primary school	civil servant
13	male	67	married	no formal education	former farmer
14	female	60	married	no formal education	house wife
15	female	25	unmarried	graduate	unemployed
16	male	45	married	Diploma	tour guide
17	female	55	married	graduate	retired teacher
18	female	53	divorced	no formal education	house wife
19	male	37	married	graduate	civil servant
20	male	54	married	primary school	farmer

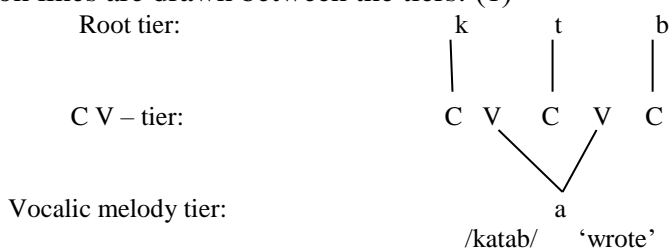
The data from these subjects were collected during the period from November 2016 until February 2017. A sophisticated mobile phone was used in the process of recordings in order to clearly capture the phonological assimilation processes of the speakers through their speech. The subject's spontaneous conversations were recorded during either family meetings or individual meetings, allowing them to talk freely about various topics. Then, the conversations were transcribed by using the International Phonetic Alphabet (IPA) transcription in a clear and natural way and the words that displayed the phonological assimilation processes were isolated and analyzed according to their types.

Non-linear phonology:

The non-linear phonology is a crucial phonological theory in the field of phonology which focuses on the hierarchical nature of relationships among the phonological units. It posits a richer architecture in that the phonemic representation is described as consisting of two or more tiers of phonological representation. The tiers are linked to each other with association lines in a standard autosegmental way. For instance, the syllable,

the stress, the phonological processes, and the distinctive features are organized in a well-established internal hierarchical order (McCarthy, 1979/1982). Within non-linear phonology there are several approaches such as the autosegmental, and the feature geometry, among others.

The autosegmental approach was first proposed by Goldsmith (1976). He proposes a solution to the problem of tone in the African languages by representing the underlying phonological representation as a multi-tiered rather than as a linear string of segments. He reveals that tones are given an autonomous representation from the rest of the segments so that regular segments would be presented at one level, and tones would be at another level where the two levels of representation are being synchronized via association lines. A significant modification came in John McCarthy's (1979 a, b and 1980) work on Arabic. He proposes a solution for representing Arabic verbs since they are structured around a root consisting of consonants only. McCarthy (1979 a) formalizes a theory which he termed the prosodic theory of nonconcatenative morphology to account for getting a correct analysis of the different binyanim '?wza:n', 'measures' in Arabic. The theory is based on that consonants and vowels of Arabic words belong to separate morphologically defined tiers. McCarthy (1979 a) presents an important development by showing that the derivation of words from consonantal roots in Arabic could be analyzed autosegmentally. He indicates that representing verbs in Arabic is done on three tiers: the root tier, the skeletal tier or the CV tier, and the vocalic melody tier. For example, the tri-consonantal verbal root /ktb/ is analyzed as follows, where association lines are drawn between the tiers: (1)



The importance of the autosegmental approach and its benefits in dealing with major phonological issues has led many researchers to modify this approach to include the organization of the distinctive features. Therefore, one of the significant modifications of the autosegmental approach is the extension of its multi-tiered representations to feature configurations. This modification provides a new conception of the theory

of distinctive features. The representation of the features in this approach is organized not as unstructured matrixes but as features that function as a unit in rules and constraints. These constraints are grouped into "constituents" which are hierarchically organized. The organization of the features is based on their gestural and acoustic properties as well as their function, while taking into consideration the operations of certain phonological rules and constraints that affect certain units but not others. This hierarchical representation of the features is called the feature geometry. Consequently, several models of the feature geometry have been developed by many scholars and researchers such as Sagey (1986), Halle, (1995), Herzallah (1990), Davis (1995) and McCarthy (1991, 1994), among others. However, almost all the researchers maintain that the arrangement of the features is always represented in a tree diagram.

Accordingly, the researchers are going to apply the autosegmental and the feature geometry approaches, mainly McCarthy's (1994) model in this study to show how these approaches of non-linear phonology represent the phonological assimilation processes in JFD in a clear and simple way.

Direction of assimilation:

Assimilation can be divided into different types according to the direction of assimilation. These types are:

1. Regressive assimilation:

When the sound is modified to appear more like the sound that follows it, the assimilation in this case is in a regressive direction. In fact, Pavlík (2009: 8) says that "regressive assimilation takes place in all languages where the sound undergoes change under the influence of a following sound". For example, in Modern Standard Arabic (MSA), the definite article /l/ assimilates with the following coronal /d/ such as the word /ʔal-da:r/ 'the house', which is realized as [ʔadda:r] is an instance of regressive assimilation.

2. Progressive assimilation:

Progressive assimilation has the opposite direction of regressive assimilation. Progressive assimilation occurs when the preceding sound is influenced by the following one. i.e. the influential sound seems to be travelling forward. An instance of the progressive assimilation is the case of forming the plural of most of the English nouns. Most of the plural nouns are formed by adding 's' to the end of these nouns. Hence, the plural of the word 'dog' is /dog+s/, which is realized as [dogz] but not [dɒgz] because the

voiced /g/, which precedes /s/ influences this following sound, changing it from voiceless into voiced.

3. Reciprocal (mutual) assimilation:

In this type of assimilation, two contiguous segments simultaneously exert influence on each other. Thus, both segments are assimilators and assimilees at the same time. This type of assimilation can be broken up into two sub-types: non-coalescent and coalescent.

The non-coalescent is the case when two sounds exert mutual influence on each other, and consequently both sounds get some feature(s) reciprocally. For example, in the word /nuTT/ which is realized as [n^w uTT] ‘jump!’, the [n] spreads nasality to the following vowel, which in turn spreads lip-rounding to the nasal whose production would otherwise require neutral lips. On the other hand, the coalescent reciprocal assimilation occurs when two segments fuse into one, and a qualitatively new sound emerges that includes features of both. For instance, an affricate sound can be heard in the English phrases ‘*what you*’ and ‘*did you*’, which can be transcribed as [wɒʃu] and [dɪdʒu], respectively. In this case the voiceless [ʃ] agrees with the voiceless [t] while the voiced [dʒ] agrees with the voiced [d] of the original phrases (Elramli, 2012:29).

Types of assimilation:

JFD displays four types of phonological assimilation processes. These types are: emphasis assimilation, voice assimilation, place assimilation, and total assimilation.

1. Emphasis assimilation:

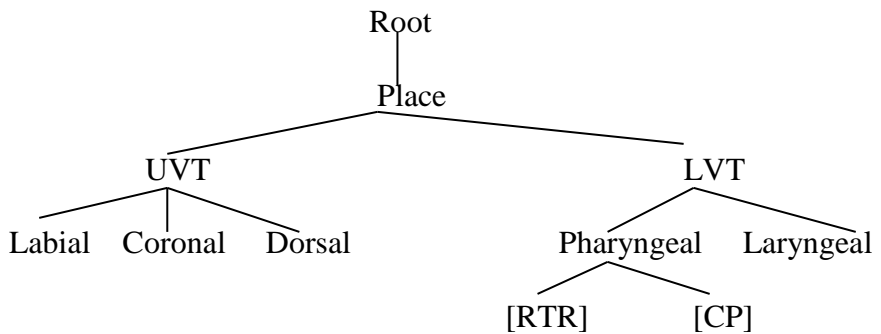
This type of assimilation is considered a progressive assimilation since it influences the following sound. In JFD, emphasis assimilation is found with measure VIII verbs. These types of verbs are recognized by the presence of the infix /-t-/ immediately after the first radical of the root. They are derived from measure I verbs and usually have the /CtaCaC/ pattern in the perfect and the pattern /yi-CtaCiC/ in the imperfect. In JFD, if we take the verbs of this measure in which the first radical is emphatic and add the infix dental stop /-t-/, a change will result to the infix dental stop /-t-/ into a dental emphatic[-T-]. It is noticed that this change is triggered by the presence of the emphatics as the first radical in the root in the derivation of measure VIII from measure I verbs. Consider the following data:

(2) Measure VIII verbs in JFD

perfect		imperfect		
/S-t-aħab/	[STaħab]	/yi-S-t-aħib/	[yiSTaħib]	‘accompany’
/S-t-adam/	[ʔiSTadam]	/yi-S-t-adim/	[yiSTadim]	‘clash’
/T-t-allaʕ/	[TTallaʕ]	/yi-T-t-alliʕ/	[yiTTalliʕ]	‘look forward’
/T-t-ahharr/	[TTahhar]	/yi-T-t-ahhir/	[yiTTahir]	‘purify’
/D-t-aɖʒaʕ/	[DTaɖʒaʕ]	/yi-D-t-aɖʒiʕ/	[yiDTaɖʒiʕ]	‘lie down’
/D-t-alam/	[DTalam]	/yi-D-t-alim/	[yiDTalim]	‘to suffer injustice’

It is clear from the data in (2) that in JFD, the infix /-t-/ is changed to a voiceless dental emphatic stop /-T-/ in both the perfect and the imperfect forms of measure VIII verbs that start with a coronal emphatic.

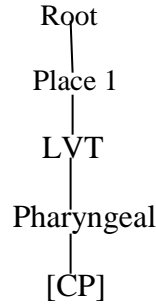
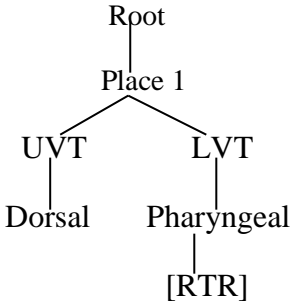
For a simpler description of the emphasis assimilation processes, the modified version of McCarthy’s model (1991) as proposed by Davis (1995) will be followed in this study. He divides the place node into the Upper Vocal Tract (UVT) and the Lower Vocal Tract (LVT) nodes. The LVT is also divided into the pharyngeal node and the laryngeal node, and the pharyngeal node dominates the terminal features Retracted Tongue Root (RTR) and Constricted pharynx (CP). By this suggested feature geometry, back consonants can be recognized from each other and from the other consonants. Davis (1995:471) represents the RTR and the CP as follows: (3)



Then, he represents the uvular, pharyngeal, laryngeal and the emphatic consonants in terms of the feature geometry as the diagrams in (4) – (7), respectively:

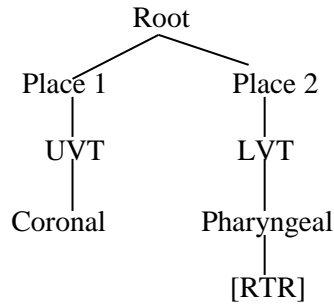
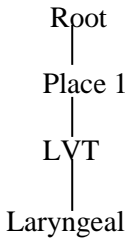
(4)The representation of uvulars (x,ϕ)

(5)The representation of pharyngeal (h,ʕ)

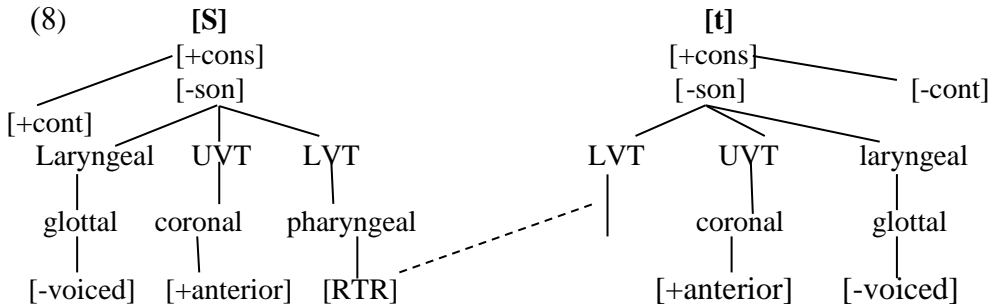


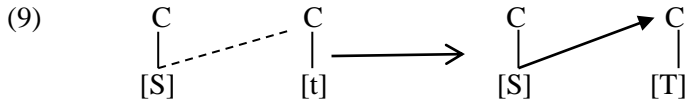
(6) The representation of laryngeals (ʕ,ħ)

(7) The representation of emphatics (S,T,D, dʕ)

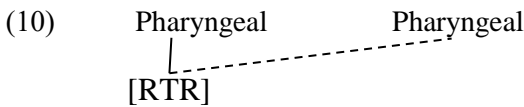


In terms of the autosegmental and the feature geometry approaches, assimilation is considered as a spreading process. Thus, in terms of the feature geometry approach, the representation of the verb /S-t-adam/ ‘clash’, which is realized as /STadam/, where the consonant /t/ assimilates into the emphatic consonant /T/ by the operation of emphasis spread, is represented in diagram (8), and in terms of the autosegmental approach, the representation of the same verb is represented in diagram (9) :





As a result of the spread of emphasis of the emphatic consonant [S], the consonant [t] assimilates into the emphatic consonant [T], as in (10):



It is worth to mention here that in JFD, the infix /-t-/ does not undergo this assimilation process if the coronal emphatic is the second or the third radical of the verbal root. The data in (11) show that the emphatic consonant is the second radical of the verbal root and the data in (12) show that the emphatic consonant is the third one. (11)

Measure I	Measure VIII/perfect	Measure VIII/imperfect	
/xaTab/	[xtaTab]	[yi-xtaTib]	'spout, speak'
/saTaḥ/	[staTaḥ]	[yi-staTiḥ]	'cracked, split'
/raSaṣ/	[rtaSaṣ]	[yi-rtaSiṣ]	'insert, press'
/naSar]	[ntaSar]	[yi-ntaSir]	'win'
/laDam/	[ltaDam]	[yi-ltaDim]	'to put a string into a needle'
/kaDam/	[ktaDam]	[yi-ktaDim]	'to suppress passion'
(12) /xalaT/	[xtalaT]	[yi-xtaliT]	'mix'
/jaraT/	[jtaraT]	[yi-ftariT]	'stipulate'
/nagaS/	[ntagaS]	[yi-ntagiS]	'reduce'
/ganaS/	[gtanaS]	[yi-gtaniS]	'hunt'
/garaD/	[gtaraD]	[yi-gtariD]	'lend'
/waṣaD/	[wtaṣaD]	[yi-wtaṣiD]	'preach'

The above examples clearly show that the infix /-t-/ does not undergo this assimilation process when the coronal emphatic is the second or the third radical of the verbal root.

2. Voice assimilation:

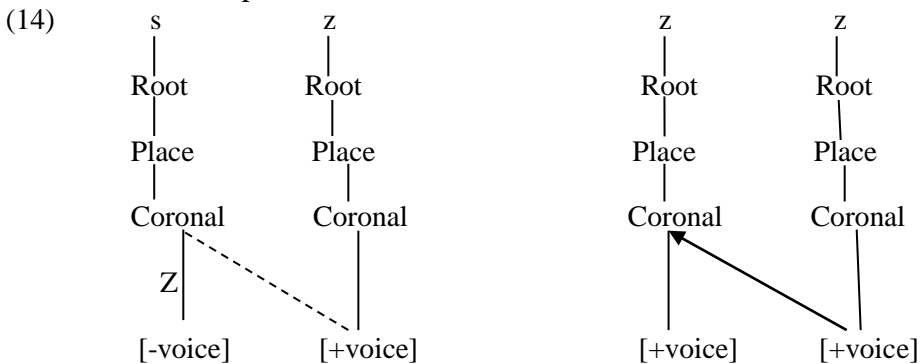
Voice is one of the most common features that play a significant role in assimilation. It is common in several languages where two neighboring sounds are adjacent in their place of articulation but differ in voice. Thus, it occurs when a sound acquires the voicing feature of an adjacent sound which could either precede or follow it. Specifically, this type of assimilation occurs when voiced and voiceless sounds are combined

because it could be difficult to pronounce voiced and voiceless sounds together. For instance, in the English verb /æbzɔrb/ ‘absorb’, the voiced /b/ becomes voiceless /p/ when it is changed to a noun, producing the word /æbzɔrpfʌn/ ‘absorption’ in order to agree with the following voiceless sound /t/.

JFD exemplifies regressive voice assimilation in different ways. In this dialect, voice assimilation occurs between the coda and the onset of two adjacent words when the two consonants are coronal obstruents. In this case, the coda changes its voice feature to agree with the onset of the following syllable. The following data exemplify such type of voice assimilation as well as emphasis assimilation:

(13)	/ki:s zaʕtar/	[ki:z zaʕtar]	‘a sack of thyme’
	/ʔaz salem/	[ʔas salem]	‘Salim’s gaz’
	/luʔuz sihil/	[luʔus sihil]	‘an easy puzzle’
	/nuS sallih/	[nus sallih]	‘half basket’
	/bas Su:ra/	[baS Su:ra]	‘only a picture’
	/ze:t Taaza/	[ze:T Taaza]	‘fresh oil’
	/waʕid Da:lim/	[waʕiD Da:lim]	‘an oppressive promise’
	/ʔarD θami:neh/	[ʔarθ θami:neh]	‘a valuable land’
	/bayet Taahir/	[bayeT Taahir]	‘a purity family’

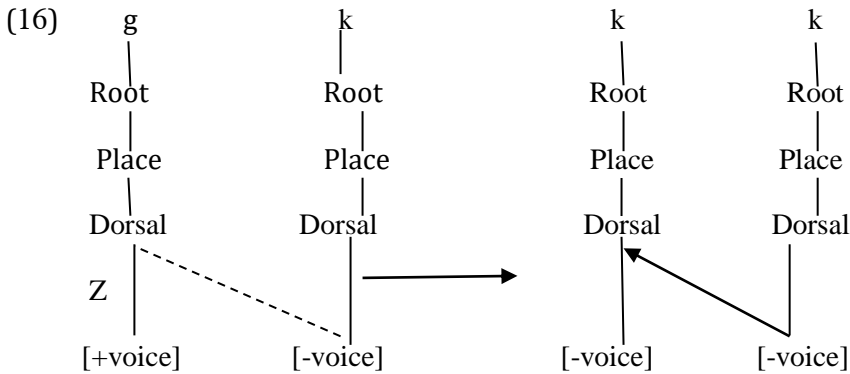
Thus, in terms of feature geometry, the representation of the voice assimilation of the words /kiis zaʕtar/ ‘a sack of thyme’ which are realized as [ki:z zaʕtar] is represented as follows:



Another case of voice assimilation that occurs in JFD is when the consonants of two adjacent words are velars. In this case, the coda changes its voice feature to agree with the onset of the following syllable. Consider the following data:

(15) /xwux ʁaali/	[xwux ʁaali]	‘expensive plums’
/mux ʁabi/	[mux ʁabi]	‘a stupid brain’
/ʔiʃmaax xafif/	[ʔiʃmaax xafif]	‘a light head cover’
/Simix xaaS/	[Simix xaaS]	‘a special glue’
/mafak gawi/	[mafak gawi]	‘a strong screw’
/salak ku:sa/	[salak ku:sa]	‘he boiled zucchinis’

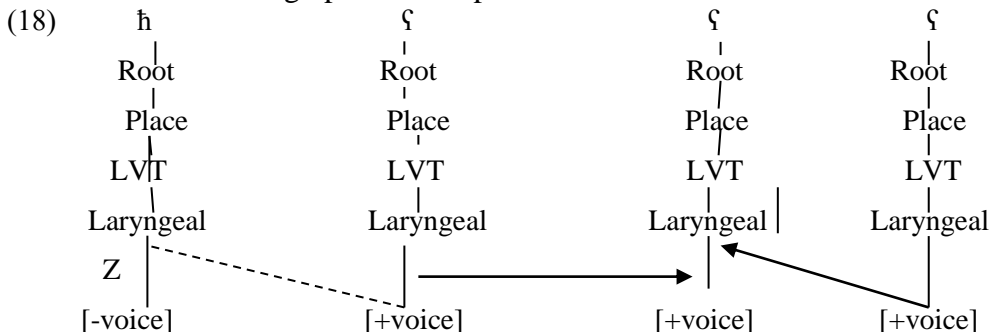
Thus, the representation of the assimilated sounds in the words [salak ku:sa] ‘he boiled zucchinis’, which are realized as [salak ku:sa] is represented as follows:



The final case of voice assimilation in JFD is found when the consonants of two adjacent words are pharyngeals, in this case also the the coda changes its voice feature to agree with the onset of the following syllable. Such as:

(17) /balaħ ʕaali/	[balaħ ʕa:l]	‘high palms’
/dʒuruħ ʕa:di/	[dʒuruħ ʕa:di]	‘a normal wound’
/ʃallaħ hummuS/	[ʃallaħ hummuS]	‘he pulled chickpea’
/nabiħ ħa:mi/	[nabiħ ħa:mi]	‘a hot spring’

The voice assimilation between the two pharyngeal sounds in the words /balaħ ʕaali/ ‘high palms’ is represented as follows:



These types of assimilation occur between two adjacent consonants when they have the same place of articulation, where the voiced consonant changed the voiceless into voiced or vice versa to become identical. However, the voice specifications are preserved if the consonants disagree in any other feature(s), such as:

(19) /walad sali:m/	[walad sali:m]	‘a healthy boy’
/kass gawi/	[kass gawi]	‘a strong glass’
/ra:s baSal/	[ra:s baSal]	‘an onion’
/samak ʁa:li/	[samak ʁa:li]	‘an expensive fish’
/ʃabak ʕa:li/	[ʃabak ʕa:li]	‘a high grill work’
/bayet ʕizz/	[bayet ʕizz]	‘a rich family’
/ki:s baTaTa/	[ki:s baTaTa]	‘a bag of potato’

It is noticed that in JFD, if two adjacent non-coronal sounds differ only in voicing, they undergo voicing assimilation, but when they differ in any other features, then voicing assimilation is blocked.

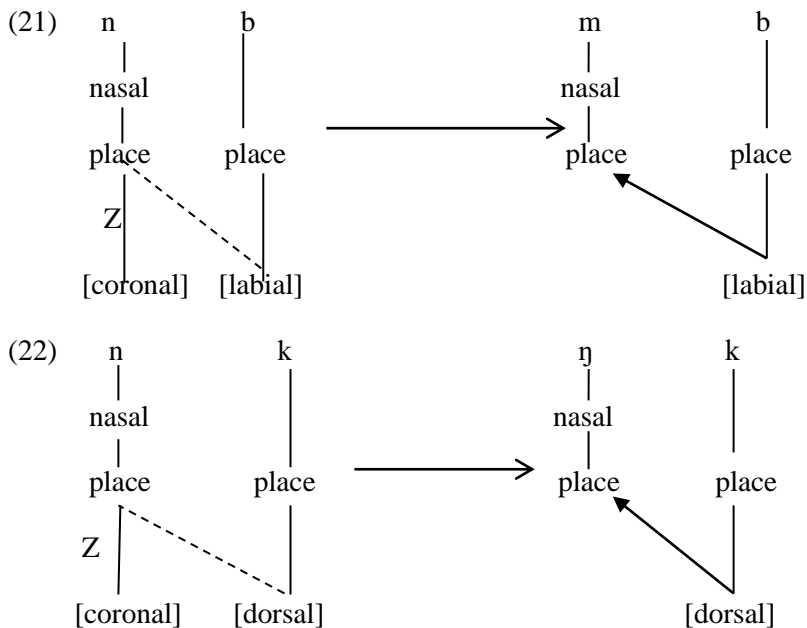
3. Place assimilation:

This type of assimilation is known as nasal homorganic assimilation because in many languages the nasal consonants are homorganic with the following obstruent (Booij 1995:64, cited in Watson, 2002). Place assimilation represents regressive assimilation. It involves a change in the place feature of a sound so that it accommodates to the place feature of an adjacent sound as in the English word /inplausible/ ‘implausible’. In such word, the coronal nasal /n/ is realized as the labial /m/ to agree with the following labial in its place feature.

In JFD, /n/ is the only nasal consonant that assimilates to an immediately following consonant. The nasal /n/ adapts the place of articulation of the following consonant. Thus, it is realized as the labial nasal [m] when it is followed by /b/, as the labio-dental [m̠] when it is followed by /f/, and as a velar nasal [ŋ] when it is followed by /k/ or /g/. Consider the following examples:

(20) /minbaʕ/	[mimbaʕ]	‘source’
/dʒanb/	[dʒamb]	‘beside’
/minbar/	[mimber]	‘tribune’
/minfað/	[min̠fað]	‘access’
/minfas/	[min̠fas]	‘exit’
/manku:ʃ/	[maŋku:ʃ]	‘ax’
/manku:b/	[maŋku:b]	‘afflicted’
/mangu:ʕ/	[maŋgu:ʕ]	‘soaked’
/mingasim/	[miŋgasim]	‘divided’

The above examples show that the dominant place specification of the triggers /b/, /f/, /k/, and /g/ spreads leftward overriding the weaker place specification of the coronal target /n/. Watson (2002: 235) states that the occurrence of nasal place assimilation occurs due to the fact to the left of a [labial] or [dorsal] consonant, the unmarked nasal is weak in terms of its position ‘left most, the coda’, its nasality, and its place feature[coronal]. In this position, the dominant place feature of the following consonant spreads from the right to the left overriding the weaker [coronal] feature. Consider the following derivation of the words /minbaʕ/ ‘source’, and /manku:b/ ‘afflicted’, which are realized as [mimbaʕ] and [maŋku:b], respectively:



Another nasal homorganic assimilation case that occurs with the nasal /n/ in JFD is when it is used as the /ʔin/ prefix in the passive voice. The prefix-final /n/ has exactly the same assimilation behavior as a stem-final /n/. Hence, it assimilates in place to a following non-coronal oral or nasal stop. Consider the following data:

- (23)
- | | | |
|-------------|-------------|--------------------|
| /ʔin-bana/ | [ʔim-bana] | ‘it was built’ |
| /ʔin-balaʕ/ | [ʔim-balaʕ] | ‘it was swallowed’ |
| /ʔin-masak/ | [ʔim-masak] | ‘he was caught’ |
| /ʔin-manaʕ/ | [ʔim-manaʕ] | ‘it was forbidden’ |
| /ʔin-kasar/ | [ʔiŋ-kasar] | ‘it was broken’ |

/ʔin-kaʃaf/	[ʔiŋ-kaʃaf]	‘it was discovered’
/ʔin-galaʃ/	[ʔiŋ-galaʃ]	‘it was pulled’
/ʔin-gatal/	[/iŋ-gatal]	‘he was killed’

In addition, when this prefix is followed by the coronal sonorants /r/ or /l/, it undergoes a total place assimilation process, such as:

(24) /ʔin-rasam/	[ʔir-rasam]	‘it was drawn’
/ʔin-rafaʃ/	[ʔir-rafaʃ]	‘it was lifted’
/ʔin -lamas/	[ʔil-lamas]	‘it was touched’
/ʔin -lazag/	[il -lazag]	‘it was fixed’

In regard to the phrase level with words that end with the nasal /n/, the following data are attested in JFD, where the nasal /n/ in the coda of the first word also assimilates to the following onset consonant in the second word:

(25) /samin baladi/	[samim baladi]	‘local margarine’
/laban barid/	[labam barid]	‘cold yoghurt’
/we:n mufta:hi/	[we:m mufta:hi]	‘where is my key’
/min mata/	[mimmata]	‘from when’
/min miin/	[mim miin]	‘from who’
/yami:n ka:ðib/	[yami:ŋ ka:ðib]	‘an untruthful oath’
/dʒubin gaasi/	[dʒubiŋ gaasi]	‘hard cheese’
/deyin gadi:m/	[deyiŋ gadi:m]	‘an old debt’
/ʃan kum/	[ʃaŋkum]	‘instead of you m.pl.’
/min kum/	[miŋkum]	‘from you m.pl.’

4. Total assimilation:

Total assimilation involves a change in the manner feature of a sound so that it agrees totally with a neighboring sound. It occurs when the assimilee takes on all the phonetic features of the assimilator. That is to say, the assimilator and the assimilee become identical, resulting in a sequence of geminate sounds. JFD displays three types of total assimilation:

1. Assimilation of the definite article /-l /:

This type of assimilation is considered a regressive one. It is witnessed in Modern Standard Arabic (MSA) where /l/ of the definite article /ʔal/ ‘the’ acquires the manner feature of a following coronal consonant as in /ʔal-raʔi:s/ ‘the president’, which is realized as [ʔar-raʔi:s] (Masacro 2007: 727). Thus, the [+lateral] /l/ is realized as [-lateral] to agree with the following [-lateral] /r/. This type of assimilation is commonly used in JFD, where the lateral /l/ of the definite article /ʔil/or /ʔal/ are totally assimilated to the following coronal consonants [ʃ, d, s, T, D, S, dʒ, θ, r, t, ð, n, z/], and thus a geminate cluster is resulted from this process. This total assimilation process

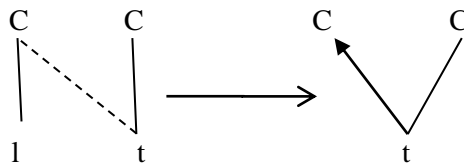
occurs when the definite article is prefixed to the nominal stems that begin with coronal consonants. This process is the traditional process which is known as ‘the sun and the moon consonants’. The following data in (26) clarify this process:

(26) **Coronal consonants**

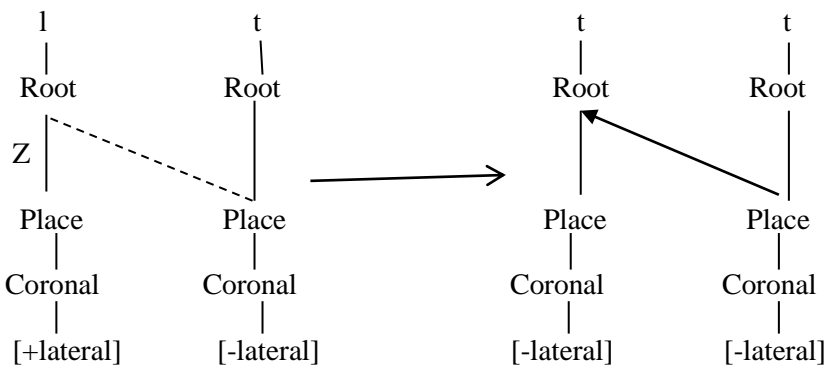
/il-fams/	[(?i)ʃʔamis]	‘the sun’
/il-darr/	[(?i)ddarr]	‘the house’
/il-sayyarah/	[(?i)ssyyarah]	‘the car’
/il-Tyibi;n/	[(?i)TTyibi:n]	‘people who are alive’
/il-Duhur/	[(?i)DDuhur]	‘the afternoon’
/il-Sabur/	[(?i)SSabur]	‘the patience/aloe’
/il-ɖʒu:ʃ/	[(?i)ɖʒɖʒu:ʃ]	‘the hunger’
/il-θo:m/	[(?i)θθo:m]	‘the garlic’
/il-rahma:n/	[(?i)rrahma:n]	‘the gracious’
/il-ti:n/	[(?i)tti:n]	‘the fig’
/il-ðurrah/	[(?i)ððurrah]	‘the corn’
/il-na:r/	[(?i)nna:r]	‘the fire’
/il-ze:t/	[(?i)zze:t]	‘the oil’

In terms of the autosegmental and the feature geometry approaches, the regressive total assimilation of /-l/ to the coronal /t/ is represented in the following ways:

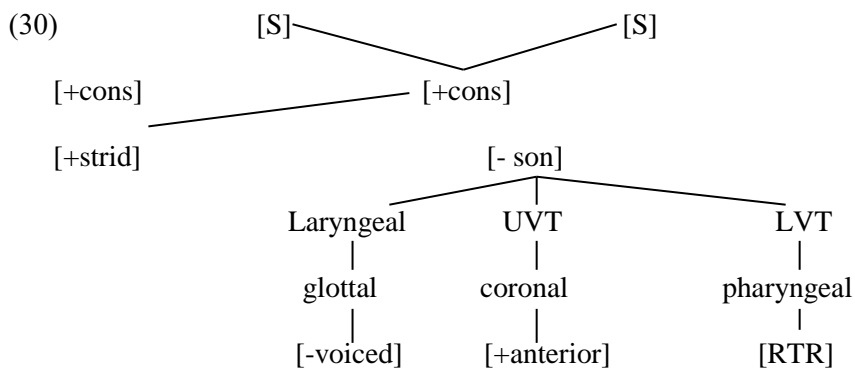
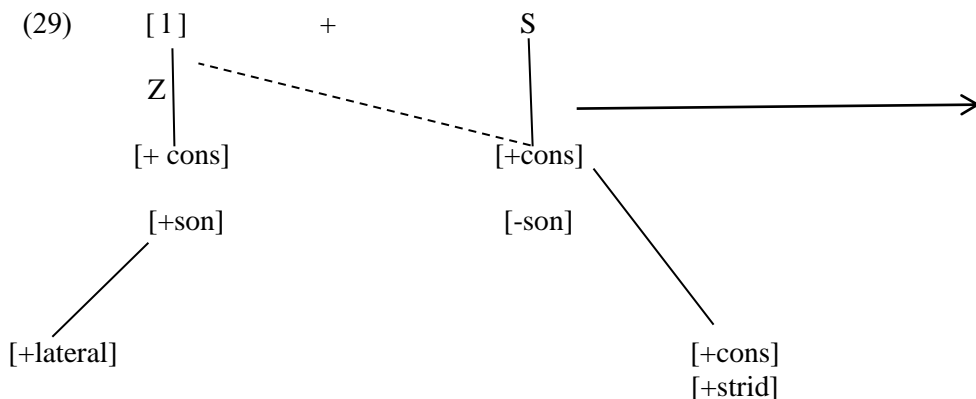
(27)



(28)



Thus, the representation of the word /?il-Sabbur/ ‘the patience/aloe’ which is realized as /?iS-Sabur/ is represented in the two diagrams below:



On the other hand, if we compare the data in (26) with the data in (31) which include nominal stems that begin with non-coronal consonants, it is noticed that the data in (31) are not influenced by this assimilation process.

(31) Non- coronal consonants

/il-gamar/	[ʔil-gamar]	‘the moon’
/il-9aalam/	[ʔil-ʕaalam]	‘the universe’
/il-yoom/	[ʔil-yoom]	‘the day’
/il-muftaah/	[ʔil-muftaah]	‘the key’
/il-biir/	[ʔil-biir]	‘the well’
/il-ʕazaal/	[ʔil-ʕazaal]	‘the deer’
/il-ʔsnaan/	[ʔil-ʔasnaan]	‘the teeth’
/il-ħaliib/	[ʔil-ħaliib]	‘the milk’
/il-kiis/	[ʔil-kiis]	‘the bag’
/il-warid/	[ʔil-warid]	‘the roses’
/il-xaruuf/	[ʔil-xaruuf]	‘the lamb’
/il-faathah/	[ʔil-faathah]	‘verse from the Holly Quran’
/il-habeelih/	[ʔil-habeelih]	‘the simple and the silly person’

The data in (26) and (31) show that JFD maintains the same traditional process of the total assimilation of the lateral /l/ of the definite article /ʔil/. All the coronal consonants trigger the total assimilation of the preceding lateral and the non-coronal consonants do not cause a similar change.

Despite the fact that the coronals in JFD trigger total assimilation in its nouns, they fail to trigger its imperfect verbs of measure I whose first radical is /l/ and the second radical is the coronal. As shown in the following examples:

(32)	perfect		imperfect		
/ladax/	[ladax]	/yi-lɗax/	[yilɗax]	*[yiddax]	‘sting’
/ladʒa/	[ladʒa]	/yi-lɗʒa/	[yilɗʒa]	*[yidʒɗʒa]	‘refuge’
/laTamm/	[laTamm]	/yu-lTumm/	[yulTumm]	*[yuTTumm]	‘buffeted’
/lazag/	[lazag]	/yi-lzag/	[yilzag]	*[yizzag]	‘stuck’
/laDam	[laDam]	/yu-lDum/	[yulDum]	*[yuDDum]	‘put a thread into a needle’
/lamentas/	[lamentas]	/yi-lmis/	[yilmis]	*[yimmis]	‘touch’
/lagaTT/	[lagaTT]	/yu-lguTT/	[yulguTT]	*[yugguTT]	‘pick’
/libis/	[libiss]	/yi-lbass/	[yilbass]	*[yibbass]	‘wear’
/liʕib/	[liʕib]	/yi-lʕab/	[yilʕab]	*[yiʕʕab]	‘play’
/lawaw/	[lawaw]	/yi-lwi/	[yilwi]	*[yiwwi]	‘twist’

The data in (32) show that in spite of the fact that the verbs start with /l/ and follows by a coronal consonant, they fail to trigger the total assimilation and behave as if they are non-coronals. These examples indicate that the coronals in the imperfect verbs of measure 1 cannot trigger the total assimilation of a preceding lateral. This can be explained that the total assimilation process cannot be triggered if the lateral /l/ is not part of the definite article prefix, and thus, the total assimilation process of /l/ is subject to a morphological condition. Hamid (1984) points out that the lateral /l/ must be part of a prefix in order to trigger total assimilation, otherwise, it fails to trigger it.

2. Assimilation of /t-/ of the detransitivizing prefix:

The second type of the total assimilation process in JFD is the one with the detransitivizing prefix /t-/ which is found with two verb measures, namely, measure V and measure VI verbs. Wright (1955:63) reports that measure V and VI verbs in Classical Arabic (CA) are derived from measure II and III verbs, respectively, by prefixing /ta-/ in the perfect form of the third person singular masculine subject. However, with the imperfect form, the prefix /ya-/ is added to the derived form of the perfect. In JFD, the

(detransitivizing /t-/) undergoes the total assimilation process before a coronal obstruent. The following examples illustrate these types:

(33) Classical Arabic

	Perfect	imperfect	
Measure V	/ta-kallam/	/ya- ta-kallam-u/	‘talk’
Measure VI	/ta-ka:lam/	/ya-ta-ka:lam-u/	‘talk’

In JFD, the word formation process applies in the same way as CA word’s formation. The only difference is that the prefixes /ya-/ and /ta-/ are realized in JFD as /yi-/ and /t/, respectively, in both the perfect and the imperfect forms of measures V and VI verbs:

(34) Jerash Fallaahi Dialect

	Perfect	Imperfect
Measure V	/t-kallam/	/yi-t-kallam/
Measure VI	/t-ka:lam/	/yi-t-ka:lam/

Thus and in regard to the process of assimilation of the detransitivizing prefix /t-/ in JFD, it shows that this prefix accounts for a total assimilation with the following consonant when the verbal stem begins with [t, d, θ, ð, dʒ, s, z, ʃ, T, S, or D/] consonants. This total assimilation process is considered a regressive one since the preceded sounds are influenced by the followed ones. It can be illustrated by the following data:

(35) Measure V in JFD

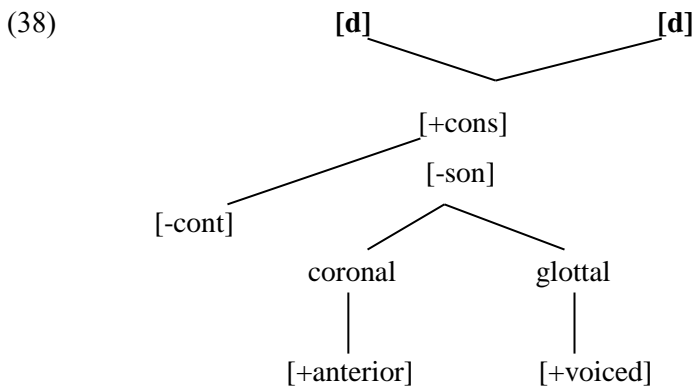
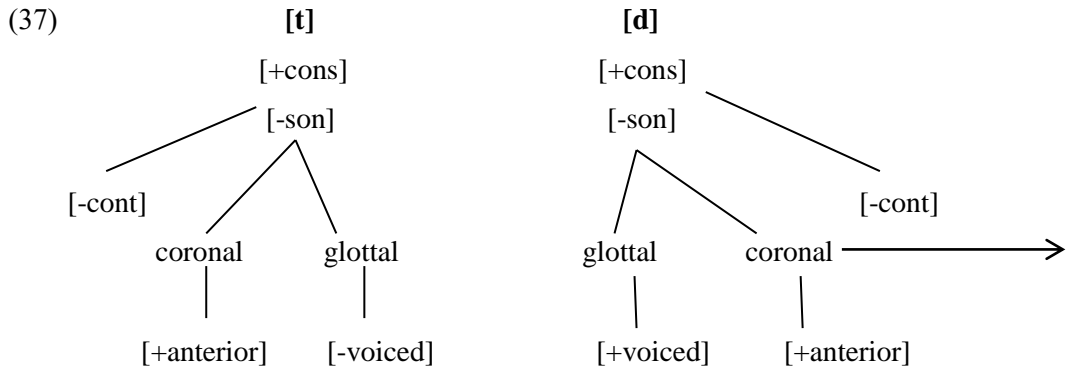
	perfect		imperfect	
/t-tabbaʕ/	[ttabbaʕ]	/yi-t-tabbaʕ/	[yittabbaʕ]	‘follow’
/t-daxxal/	[ddaxxal]	/yi-t-daxxal/	[yiddaxxal]	‘intervene’
/t-θawwar/	[θθawwar]	/yi-t-θawwar/	[yiθθawwar]	‘revolute’
/t-ðawwag/	[ððawwag]	/yi-t-ðawwag/	[yiððawwag]	‘taste’
/t-dʒaddad/	[dʒdʒaddad]	/yi-t-dʒaddad/	[yidʒdʒaddad]	‘renew’
/t-sallag/	[ssallag]	/yi-tisallag/	[yissallag]	‘climb’
/t-zarraʕ/	[zzarraʕ/	/yi-t-zarraʕ/	[yizzarraʕ]	‘implant’
/t-ʃakkar/	[ʃʃakkar]	/yi-t-ʃakkar/	[yiʃʃakkar]	‘thankful’
/t-Tallag/	[TTallag]	/yi-t-Tallag/	[yiTTallag]	‘got divorced’
/t-Sannaʕ/	[SSannaʕ/	/yi-t-Sannaʕ/	[yiSSannaʕ]	‘overact’
/t-Dallam/	[DDallam]	/yi-t-Dallam/	[yiDDallam]	‘plain’

(36) Measure VI in JFD

	perfect		imperfect	
/t-ta:rak/	[tta:rak]	/yi-t-ta:rak/	[yitta:rak]	‘leave’
/t-da:wa/	[dda:wa]	/yi-t-da:wa/	[yidda:wa]	‘medicate’
/t-θa:gal/	[θθa:gal]	/yi-t-θa:gal/	[yiθθa:gal]	‘feel heavy’

/t-ð̥a:kar/	[ð̥ð̥a:kar]	/yi-t-ð̥a:kar/	[yið̥ð̥a:kar]	‘to remember’
/t-d̥ʒa:las/	[d̥ʒd̥ʒa:las]	/yi-t-d̥ʒa:las/	[yid̥ʒd̥ʒa:las]	‘to set with’
/t-sa:raʃ/	[ssa:raʃ]	/yi-t-sa:raʃ/	[yissa:raʃ]	‘to be faster’
/t-za:yad/	[zza:yad]	/yi-t-za:yad/	[yizza:yad]	‘to increase’
/t-ʃa:war/	[ʃʃa:war]	/yi-t-ʃa:war/	[yiʃʃa:war]	‘confers’
/t-Ta:wal/	[TTa:wal]	/yi-t-Ta:wal/	[yiTTa:wal]	‘encroach’
/t-Sa;dam/	[SSa:dam]	/yi-t-Sa:dam/	[yiSSa:dam]	‘clash’
/t-Da:har/	[DDa:har]	/yi-t-Da:har/	[tiDDa:har]	‘pretend’

The data in (35) and (36) show that the prefix /t-/ assimilates totally to the following consonant of a verbal stem that starts with [t, d, θ, ð, d̥ʒ, s, z, ʃ, T, S, or D/] consonants. In terms of the feature geometry approach, the representation of the assimilated verb of measure VI /t-da:wa/, ‘medicate’, which is realized as [dda:wa] is represented as follows:



It is clear from data (35) and (36) that the prefix /t-/ assimilates totally to the following consonant of a verbal stem that starts with the consonants [t, d, θ, ð, dʒ, s, z, ʃ, T, S, or D/].

On the other hand, when we examine measure V and measure VI verbal stems that start with the rest of JFD consonant phonemes, it is seen that the detransitivizing prefix /t-/ fails to assimilate with the following consonants. Consider the data in (39) and (40):

(39) **Measure V in JFD**

perfect		imperfect		
/t-ballal/	[tballal]	/yi-t-ballal/	[yitballal]	‘dampen’
/t-fadʒdʒar/	[tfadʒdʒar]	/yi-t-fadʒdʒar/	[yitfadʒdʒar]	‘explode’
/t-kaddar/	[tkaddar]	/yi-t-kaddar/	[yitkaddar]	‘be annoyed’
/t-gaTTaʃ/	[tgaTTaʃ]	/yi-t-gaTTaʃ/	[yitgaTTaʃ]	‘cut’
/t-xarradʒ/	[txarradʒ]	/yi-t-xarradʒ/	[yitxarradʒ]	‘graduate’
/t-ʃadʒdʒan/	[tʃadʒdʒan]	/yi-t-ʃadʒdʒan/	[yitʃadʒdʒan]	‘knead’
/t-ħarrar/	[tharrar]	/yi-t-ħarrar/	[yitharrar]	‘be free’
/t-ʔaxxar/	[tʔaxxar]	/yi-t-ʔaxxar/	[yitʔaxxar]	‘be late’
/t-kaDDa/	[tkaDDa]	/yi-t-kaDDa/	[yitkaDDa]	‘cover’
/t-naSSat/	[tnaSSat]	/yi-t-naSSat/	[yitnaSSat]	‘eavesdrop’
/t-laSSaʃ/	[tlaSSaʃ]	/yi-t-laSSaʃ/	[yitlaSSaʃ]	‘trying to steal’
/t-raʃʃaħ/	[traʃʃaħ]	/yi-t-raʃʃaħ/	[yitraʃʃaħ]	‘nominated’
/t-yattam/	[tyattam]	/yi-t-yattam/	[yityattam]	‘be orphan’
/t-ħaʃʃam/	[thaʃʃam]	/yi-t-ħaʃʃam/	[yithaʃʃam]	‘smash’
/t-warraT/	[twarraT]	/yi-t-warraT/	[yitwarraT]	‘be involved with troubles’

(40) **Measure VI**

perfect		imperfect		
/t-ba:laT/	[tba:laT]	/yi-t-ba:laT/	[yitba:laT]	‘be rude’
/t-fa:Sah/	[tfa:Sah]	/yi-t-fa:Sah/	[yitfa:Sah]	‘eloquent’
/t-ka:ram/	[tka:ram]	/yi-t-ka:ram/	[yitka:ram]	‘be generous’
/y-ga:sam/	[tga:sam]	/yi-t-ga:sam/	[yitga:sam]	‘divide’
/t-xa:baθ/	[txaabaθ]	/yi-t-xa:baθ/	[yitxaabaθ]	‘be malicious’
/t-ʃa:Taf/	[tʃaaTaf]	/yi-t-ʃa:Taf/	[yitʃaaTaf]	‘be sympathetic’
/t-ħa:rab/	[thā:rab]	/yi-t-ħa:rab/	[yitha:rab]	‘adverse’
/t-ha:waj/	[tha:waj]	/yi-t-ha:waj/	[yitha:waj]	‘fight’
/t-ʔa:ka/	[tʔaaka]	/yi-t-ʔa:ka/	[yitʔaaka]	‘be hurt’
/t-kaaba/	[tka:ba]	/yi-t-ka:ba/	[yitka:ba]	‘be stupid’
/t-ma:raD/	[tma:raD]	/yi-t-ma:raD/	[yitma:raD]	‘be sick’
/t-na:sab/	[tna:sab]	/yi-t-na:sab/	[yitna:sab]	‘propinquity’
/t-la:Taf/	[tla:Taf]	/yi-t-la:Taf/	[yitla:Taf]	‘be kind’
/t-ra:ʃg/	[tra:ʃg]	/yi-t-ra:ʃg/	[yitra:ʃg]	‘hurl’

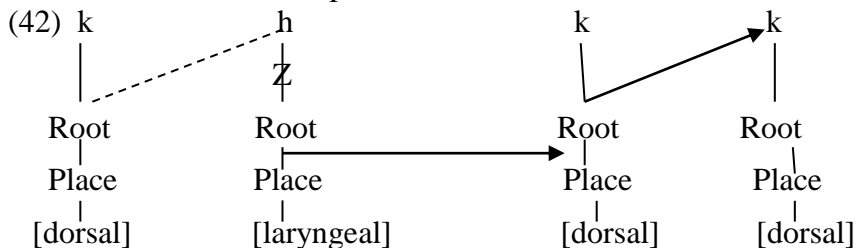
/t-wa:ɖʒah/	[twa:ɖʒah]	/yi-t-wa:ɖʒah/	[yitwa:ɖʒah]	‘cope with’
/t-ya:sar/	[tya:sar]	/yi-t-ya:sar/	[yitya:sar]	‘get left’

3. The deletion of /h/ of the nominal/ genitive third person dependent pronoun:

In JFD, the phoneme /h/ has a limited distribution in many Arabic dialects (Watson, 2002:11). Thus, this phoneme imposes restrictions on its distribution. In JFD, when the nominal/genitive third person dependent pronoun is suffixed to a voiceless obstruent-final word, the phoneme /h/ is deleted and the voiceless obstruent surfaces as a geminate, producing a total progressive assimilation of the last voiceless obstruent. Consider the following data from JFD:

(41) /θuluθ-ha/	[θuluθθa]	‘one third of it’
/wiriθ-hum/	[wiriθθum]	‘he inherited them’
/sakkat-ha/	[sakatta]	‘he made her to be quiet’
/falat-hum/	[falattum]	‘he freed them’
/ħabas-ha/	[ħabassa]	‘he imprisoned her’
/lamas-hum/	[lamassum]	‘he touched them’
/nasax -ha/	[nasaxxa]	‘he copied it’
/nafax-hum/	[nafaxxum]	‘he blew them’
/rabaT-ha/	[rabaTTa]	‘he tied her’
/lagaT-hum/	[lagaTTum]	‘he picked them’
/Tabaʃ-ha/	[Tabaʃʃa]	‘he hit it’
/nagaʃ-hum/	[nagaʃʃum]	‘he carved them’
/faħaS-ha/	[faħaSSa]	‘he tested her’
/ganaS-hum/	[ganaSSum]	‘he shot them’
/tarak-ha/	[tarakka]	‘he left her’
/masak-hum/	[masakkum]	‘he caught them’
/ʃalaʃf-ha/	[ʃalaʃʃa]	‘he chewed it’
/ħaraʃf-hum/	[ħaraʃʃum]	‘he stirred them’

Thus, the total assimilation of the word /tarak-ha/ ‘he left her’ which is realized as [tarakka] is represented as follows:



Conclusion:

The second type of assimilation is voice assimilation. In JFD, voice assimilation occurs between the coda and the onset of two adjacent words in different cases. First, when the two consonants are coronal obstruents. Second, when the consonants of two adjacent words are velars. Third, when the consonants of two adjacent words are pharyngeal. In all these three cases, the coda changes its voice feature to agree with the onset of the following syllable.

The third type of assimilation is the nasal homorganic assimilation. In JFD, /n/ is the only nasal consonant that assimilates to an immediately following consonant. The nasal /n/ adapts the place of articulation of the following consonant. Therefore, it is realized as the labial nasal [m] when it is followed by /b/, as the labio-dental [ɱ] when it is followed by /f/ and as a velar nasal [ŋ] when it is followed by /k/ or /g/.

The last type of assimilation in JFD is total assimilation which exhibits itself in three ways: the first type is found with the definite article /ʔil/ or /ʔal/. The definite article always produces total assimilation to the nominal stems that begin with the coronal consonants, and thus a geminate cluster results from this process, while the nominal stems that begin with non-coronal consonants are not influenced by this assimilation process. On the other hand, the imperfect verbs whose their first radical consonant is /l/ and the second radical is a coronal consonant fail to trigger total assimilation. The second type of total assimilation is found by using the detransitivizing prefix /t-/ with measure V and measure VI verbs. The verbs of these two measures which start with [t, d, θ, ð, dʒ, s, z, ʃ, T, S, or D]/ sounds can only trigger total assimilation between them and the detransitivizing prefix /t-/. These consonants are known as coronals, but [-sonorant]. However, the rest of the coronals which are the [+sonorant] ones, namely, the [n, l, r] sounds do not trigger total assimilation with the prefix /t-/. Finally, the deletion of the consonant /h/ of the nominal/ genitive third person dependent pronoun. In this type of total assimilation the consonant /h/ is deleted and the voiceless obstruent surfaces as a geminate, producing a total assimilation of the last voiceless obstruent.

References:

- Carr, Philip (1993). **Phonology**. Macmillan Modern Linguistics Series.
 Chomsky, N & Halle, M. (1968). **The Sound Pattern of English**. New York: Harper& Row.

- Davis, Stuart (1995). Emphasis Spread in Arabic and Grounded Phonology. **Linguistic Inquiry**, 26. 3: 465-498.
- Elramli, Yousef (2012). **Assimilation in the phonology of a Libyan Arabic Dialect: a Constraint- Based approach**. Unpublished doctoral dissertation, Newcastle University.
- Goldsmith, J. (1976). **Autosegmental Phonology**. Unpublished Doctoral dissertation. Cambridge: Massachusetts Institute of Technology.
- Halle, M. (1995). Feature Geometry and Feature Spreading. **Linguistic Inquiry**. 26, 1.
- Hamid, Abdel Halim M. (1984). **A Descriptive Analysis of Sudanese Colloquial Arabic Phonology**. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.
- Herzallah, R. S. (1990). **Aspects of Palestinian Arabic Phonology: A Non-Linear Approach**. Unpublished Doctoral dissertation. Cornell University.
- Jun, J. (2004). 'Place assimilation', in Hayes, B., Kirchner, R. and Steriade, D. (eds.) **Phonetically based phonology**. Cambridge: Cambridge University Press, 58-86.
- Katamba , Francis (1989). **An Introduction to Phonology**. New York: Longman Inc.
- Mahadin, R. & Bader, Y. (1996). Emphasis Assimilation Spread in Arabic and Feature Geometry of Emphatic Consonants. **Journal of Humanities and Social Sciences**. 12,17-52.
- Masacro, Joan (2007). External Allomorphy and Lexical Representation. **Linguistic Inquiry**. 38, 4: 715-735.
- McCarthy, J. (1979 a). **Formal problems in Semitic phonology and morphology**. Unpublished Doctoral dissertation., MIT, Cambridge, MA
- McCarthy, J. (1979 b). On Stress and Syllabification. **Linguistic Inquiry**. 10.3: 443-465.
- McCarthy, J. (1980). A Note on the Accentuation of Damascene Arabic. **Studies in the Linguistic Sciences**, 10, 2: 77-98.
- McCarthy, J. (1981). A Prosodic Theory of Nonconcatentive Morphology. **Linguistic Inquiry**, 12: 373-418.
- McCarthy, J. (1982). Prosodic Templates, Morphemic Templates, and Morphemic Tiers. In *The Structure of Phonological Representations*, edited by H. van der Hulst and N. Smith, 191-223. Dordrecht: Foris.

- McCarthy, J. (1988). Features Geometry and Dependency: A review. **Phonetica**, 45: 84-108.
- McCarthy, J.1994. **The Phonetics and Phonology of Semitic Pharyngeals**. In P. Keating (ed.). Phonological Structure and Phonetic Form. Cambridge: Cambridge University Press.
- Pavlik , Radoslav (2009). A Typology of Assimilation. SKASE Journal of Theoretical Linguistics [online]. 6,1. Available on http://www.skase.sk/Volumes/JTL13/pdf_doc/01.pdf. ISSN 1339-782X.
- Sagey, E. (1986).**The Representation of Features and Relations in Nonlinear Phonology**. Unpublished doctoral dissertation, MIT.
- Watson, J. C. E (2002). **The phonology and morphology of Arabic**. Oxford: Oxford University Press.
- Wright, W. (1955). **A Grammar of the Arabic Language**. Cambridge: Cambridge University Press.