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HANDLING CODA CLUSTERS FORMED BY GEMINATES IN DIFFERENT ARABIC DIALECTS

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ABSTRACT

This article is meant to discuss the different ways CVCC and CVVCC are handled by speakers of different forms of Jordanian and other Arabicdialects. The article explains the different ways in which CVCC is handled by speakers of different forms of Jordanian Arabic from an Optimality Theory perspective. The article also sheds light on the different repair strategies speakers of such Arabic dialects resort to in order to abide by the highly ranked constraint 'no three moras ****3μ*** *when producing CVVCC. Four suggested strategies in the literature were revisited and analysis within the framework of the Optimality Theory was provided.*

KEYWORDS**:** *Degemination, Epenthesis, Nucleus, Repair Strategies, Shortening*

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INTRODUCTION

The aim of this article is to illustrate the different ways speakers of different forms of Jordanian Arabic handle two particular syllable structures- CVCC where the two consonants in coda position form geminate. The article also discusses some debatable repair strategies used by the speakers of Jordanian Arabic as well as other forms of Arabic in their attempt to abide by the ***3μ** constraint concerning CVVCC. These strategies have been suggested in various studies (AbuAbbas 2003; Btoosh 2006; Al-Sughayer 1990; Benhallam 1980; Abu Salim 1982; McCarthy 1979, 1981). The article introduces an explanation of handling CVVCC within the framework of the Optimality Theory (OT).

Consonants and Vowels in Jordanian Arabic

A comprehensive list of the Jordanian consonants and vowels is outlined in the appendix (1). Consonants in Ammani Arabic are almost identical to those listed in the appendix except for the softening of the emphatic /D/, /T/, and /S/ that are produced as /d/, /t/, and /s/ by Ammani people. Also, /dʒ/ is softened into /ʒ/. /ð/ is not used by Ammani people, /d/ is used instead, and /ð/ is replaced by /z/.

Vowels, however, in Ammani Arabic are the same as the vowels listed in the appendix which were borrowed from AlWer (2007) and Abdel-Jawad (1986).

SYLLABLE STRUCTURE IN JORDANIAN ARABIC

Syllable structure in everyday Jordanian Arabic (JA) differs radically from Modern Standard Arabic (MSA).

AbuAbbas (2003) and Dana (2009) stated that in JA a CVC syllable is as light as a CV in word-final position and is heavy elsewhere. The syllable structure in MSA and in other dialects of Arabic is maximally bimoraic (Broselow 1995; McCarthy & Prince 1990). In other words, a syllable cannot include more than two moras.

Many researchers have investigated different Jordanian dialects. AbuAbbas (2003) studied Ajluni Arabic, a form used by people living in the northern part of Jordan while Btoosh (2006) studied Karaki Arabic a form used in the southern part of Jordan. In addition, Al-Sughayer (1990) compared the different rural forms of Jordanian Arabic used by people in another town in the northern part of Jordan (NJA).

With respect to initial, medial, and final consonant clusters, El-Badarin and Bani-Yasin (1993) described various consonant clusters in a dialect in a village called Hartha in the northern part of Jordan. Tayeh, Daana, and Tahayneh (2012) described all kinds of permissible clusters in Toulkarim dialect, the dialect used in Toulkarim in Palestine.

Syllable patterns in JA, in the light of the lists suggested by Abu-Abbas, Btoosh, and AlSughayer are summarised as follows:

CV, CVC, CVV, CVVC, CVCC, CVVCC, CCVC, CCVVC, CCVCC

The three varieties of JA share almost all the syllable patterns listed above except for CCVC which is not found in NJA and CCVCC which is found in NJA but not in Ajluni nor in Karaki Arabic. Ammani Arabic shares almost all the syllable patterns listed above except for CVVCC. As a matter of fact, Ammani Arabic adds a CCCVC syllable structure to the list above (Daana 2009).

CODAS IN JA

Complex codes are demonstrated in the four Jordanian dialects. This violates the universal ***COD** constraint from the perspective of OT:

***COD**

A Syllable must not have a coda

(Prince & Smolensky, 2004: 41)

The violation of this structural constraint by those four forms indicates the low rank this constraint enjoys in the grammar of the four above-stated dialects.

As far as coda cluster is concerned, El-Badarin and Bani-Yasin (1993) posited that coda clusters in NJA are the least frequent clusters among the three positions. Tayeh, Daana, and Tahayneh (2012) also showed that consonant clusters in final position are more structurally conditioned compared to clusters in onset or medial positions in TK Arabic.

Abu-Abbas (2003) claimed that CVCC only exists in JA when the segments in the cluster are geminated. He stated that other CVCC structures –when not geminate- are always treated by epenthesis as in [kalib] *dog* for /kalb/. Ammani and Karaki dialects, in comparison, allow such a cluster in such a position providing that the Sonority Sequencing Principle (SSP) is respected. In other words, if the sonority of the second segment of the cluster is higher than that of the first, coda clusters are not permitted.

Hence, the fact that coda consonant clusters tentatively respect the sonority restriction on the distribution of segments in a cluster result in the emergence of code clusters in Ammani and Karaki dialects conditioned by falling sonority.

A word like /kalb/ *dog* with a coda cluster of falling sonority is produced as /kalb/, but a word like /ʔabir/ *grave* is never produced as /ʔabr/ in neither Ammani nor Karaki forms. The fact that these forms of JA do not allow coda clusters with rising sonority is consistent with Kiparsky's hypothesis. Kiparsky (2003) classified Syrian, Palestinian, and Jordanian Bani-Hassan dialects as VC-dialects that permit no phrase-final CC clusters except with falling sonority. Therefore in Ammani Arabic as well as Karaki Arabic, the sonority of the first consonant must be higher than that of the second consonant in word-final CVCC syllables.

This CVCC structure is restricted to the final position not only in JA but also in other varieties of Arabic (Broselow, Huffman, Chen, & Hsieh 1995; Broselow, Chen, & Huffman 1997; Abu-Salim & Abd-el-Jawad 1988; Kiparsky, 2003). In Karaki and Ammani Arabic, coda clusters are attested as long as they adhere to **SON** constraint (Btoosh 2006; Dana 2009).

SON

In syllable, sonority increases toward the peak and decreases toward the margins.

(Clements, 1990)

The fact that Ajluni Arabic does not allow coda clusters indicates the higher rank of ***COMPLEXcoda** in its grammar.

***COMPLEXCoda**

A syllable should have at most one consonant in coda position.

(Archangeli and Langendoen, 1997)

Table 1 below shows the grammar that is responsible for the prohibition of coda clusters in Ajluni Arabic.

Table 1: Not Permitted Coda Clusters in Ajluni Arabic

/kalb/	*COMPLEXcoda	DEP-V-IO	SON	*Coda
→/kalib/		*		*
/kalb/	*!			*
/ɡabr/				
/ɡabr/	*!		*	*
→/ɡabʊr/		*		*

Where **DEP-V-IO** entails:

DEP-V-IO

Every vowel of the output must have a correspondence in the input.

(Kager, 1999)

The tendency of the existence of syllables like CVCC in Ammani and Karaki dialects indicates that, unlike the grammar of Ajluni dialect, the grammar of Ammani and Karaki dialects rank **DEP-V-IO** constraint higher than ***COMPLEX Coda.** This ranking is illustrated in Table 2.

Table 2: Permitted Coda Clusters in Ammani and Karaki Arabic

/kalb/	DEP-V-IO	*COMPLEXcoda
→/kalb/		*
/kalib/	*!	

Since ***COMPLEXcoda** is outranked by **DEP-V-IO** in Ammani Arabic, the first candidate wins over the second. The fact that Ammani Arabic, as well as Karaki Arabic, allow coda clusters providing that the cluster adheres to **SON** shows a higher ranking of **SON** compared to the ***COMPLEXcoda**. Table 3 below represents the grammar responsible for the emergence of the conditioned coda clusters in Ammani Arabic as well as Karaki Arabic.

Table 3: The Emergence of the Conditioned Coda Clusters in Ammani and Karaki Arabic

/kalb/	SON	DEP-V-IO	*COMPLEXcoda	*Coda
/ kalib/		*!		*
→/kalb/			*	*
/gabr/				
/gabr/	*!		*	*
→/ʔ/gabir/		*		*

The fact that geminates violate **SON** and ***COMPLEXcoda** makes them marked cross-linguistically, and hence prohibited (Crowhurst 2001:578); nonetheless, they exist. In this case, **SON** does not account for CVCC which ends with a geminate as in a word like //ʕamm/ *uncle*. This is so because both elements of a geminate have equal sonority value. Therefore, the constraint ***GEM** is needed to account for the emergence of this CVCC with a geminate in Ajluni, Karaki, and Ammani Arabic.

***GEM**

Geminates are prohibited.

(Btoosh, 2006:213)

Since geminates occur word-medially as well as word-finally in all the Arabic dialects under study, ***GEM** is tolerated by such dialects. That is to say, it is not highly ranked which makes the appearance of geminates permissible.

On the other hand, Kenstowicz introduced the Universal Integrity Hypothesis which accounts for the resistance of geminates against separation and/or alteration- **IDENT-IO[GEM].**

IDENT-IO[GEM]

Output correspondent of an input [gem] are also [gem].

(Kenstowicz, 1995)

This leads to Table 4 which illustrates the grammar that is responsible for the production of CVCC when coda clusters are formed of geminates in such Jordanian dialects; even though it incurs a violation of **SON**.

Table 4: Coda Clusters with Geminates

/ʕɑmm/	IDENT-IO[GEM]	SON	*COMPLEXcoda	DEP-V-IO	*GEM	*CODA
/ʕam/	*!					*
/ʕamim/	*!			*		*
→/ʕamm/		*	*		*	*

Deleting one segment of the geminate in the first candidate incurs a violation of **IDENT-IO[GEM]**. In addition, since the last consonant in coda position at the end of the word is weightless in Arabic, the deletion of one segment of the cluster violates the structural constraint that prohibits prosodic words with less than two moras. Btoosh suggested a **W-MIN** constraint that also makes the first candidate in Table 4 lose.

W-MIN

A **prosodic word contains at least two moras.**

(Btoosh, 2006:214)

Thus inserting **W-MIN** to the grammar of such dialects leads to Table 5.

Table 5: The Emergence of CVCC where CC are Elements of a Geminates

/ʕɑmm/	IDENT-IO[GEM]	W-MIN	SON	*COMPLEXcoda	DEP-V-IO	*GEM	*CODA
/ʕam/	*!	*					*
/ʕamim/	*!				*		*
→/ʕamm/			*	*		*	*

Inserting a short vowel to break up the elements of the geminate in the second candidate incurs a fatal violation of **IDENT-IO[GEM]**. Consequently, the third candidate wins over the others.

Hence, the grammar responsible for the emergence of CVCC only when the last consonants are members of a geminate in Ajluni Arabic is:

IDENT-IO[GEM]>> W-MIN>> *COMPEXcoda>>DEP-V-IO>> SON>> *GEM>>*CODA

Whereas, in Ammani and Karaki Arabic, the grammar that is responsible for the emergence of the CVCC syllable structure whether the cluster in coda consists of a geminate or not as long as it abides by**SON** is:

IDENT-IO[GEM]>>W-MIN>>SON>>*COMPEXCODA>>DEP-V-IO>>*GEM>> *CODA

The second controversial syllable structure is CVVCC, investigating it we notice that CVVCC in words such as /ma:rr/ *passer-by* has coda cluster that consists of a geminate. Such a cluster which is preceded by a long vowel creates a problem with the bimoraic condition proposed by Broselow (1995) and McCarthy and Prince (1990). This structure violates the "no trimoraic syllable" constraint as the language is bimoraic and only allows a maximum of two moras in a syllable.

***3μ**

No trimoraic syllables

(Kager, 1999)

This notion of bimoracity of the syllable and its violation by CVVCC is reflected in Ratcliffe's suggestion (1998). Ratcliffe suggested that Arabic does not allow syllables with more than two moras except in words with the CVVCC structure in which the first consonant in the coda position forms the first part of a geminate. It is assumed that Arabic has this ***3μ** ranked high in its grammar.

Therefore, it is expected that speakers of different dialects resort to four different mechanisms in order to avoid violating ***3μ**. These four different mechanisms or repair strategies are: (i) degemination – deleting the second segment of the geminates– ending up with a CVVC suggested by AbuAbbas (2003), (ii) the reduction of the nucleus ending up with a CVCC also suggested by AbuAbbas (2003), (iii) adjoining two unlicensed segments proposed by Btoosh (2006), and (iv) the insertion of the epenthetic /i/ to break up the cluster (Broselow 1992; Benhallam 1980).

AbuAbbas (2003) posited that since coda cluster in CVVCC /ma:rr/ *passer-by* is exclusive to geminates and since it violates the ***3μ**, Ajluni speakers, in their attempt to respect the highly ranked ***3μ,** degeminate or delete the second segment of the geminate ending up with a bimoraic CVVC since the consonant left after the deletion becomes weightless in word-final position. This strategy has no changing effects on the grammar of the word *per se*. Therefore, what makes Ajluni people delete one segment of the geminate is shown in Table 6 below.

Table 6: The Grammar Responsible for Degemination as a Repair Strategy

/mɑ:rr/	*3 μ	IDENT-IO[GEM]	W-MIN	*COMPLEXcoda	DEP-V-IO	SON	*GEM	*Coda
→/ma:r/		*!						*
/ma:rr/	***!**			*		*	*	*
/ma:rir/		*!			*			*

The second suggested repair strategy is the reduction of the nucleus or the process of the long vowel shortening strategy. This strategy results in a change in the grammatical category of the word. For instance, if a word like /ma:rr/ of a noun person category *passer-by* underwent a nucleus reduction, the resulting /marr/ would be of a different grammatical category which indicates the third person singular masculine past tense *he passed by*. None of the speakers of the Jordanian Arabic dialects, however, resort to this vowel shortening strategy.

Btoosh, on the other hand, chose the third repair strategy to justify the appearance of the CVVCC structure in Karaki Arabic. He elaborated that Karaki Arabic respects this ***3μ** in a different way. His discussion concluded that "KA (Karaki Arabic) prefers adjoining the last unlicensed consonant in CVVC-C to the coda over deleting it" (2006: 216) unlike, Ajluni speakers who prefer deleting the second segment of the geminate. This repair strategy results in the surface of CVVCC in Karaki Arabic even though it has three moras.

Btoosh's (2006) implicit adherence to governmental phonology has made him try to work out a solution within a theoretical framework in an attempt to justify the reason why CVVCC is used by KA speakers in spite of its three moras. He claimed that the underlying form of CVVCC is CVVCCV(n) with the inflection of the stative indefinite that is used in MSA. He further explains that (n) has been lost, resulting in CVVCCV with a weak vowel at the end. This weak vowel has also been lost resulting in the CVVCC form. The consequence of the loss of the weak vowel would yield a semi- syllable consonant, giving the CVVC.C form. Up to this point, the problematic three-mora issue has not been solved. He further claimed that since the language allows two semi-syllables in word-final position, the form would turn out as CVV.C.C. Therefore, the final structure of the underlying CVVCCV(n) after the loss of V(n) and the process of semi-syllabification would look like CVV.C.C. He concluded that "KA [unlike Ajluni Arabic] prefers adjoining the last unlicensed consonant in

CVVC.C to the coda over deleting it" (2006: 216) resulting in a three-moraic syllable. This has not explained the violation of the ***3μ** practically.

Btoosh's way of approaching the three-mora problem is actually not accurate because the CVVCCV(n) with the third person indefinite inflection cannot be considered the underlying form of CVVCC for the following reasons:

- This indefinite inflection is not only attached to a structure like CVVCC in Modern Standard Arabic, but it is also attached to all sorts of nouns, adjectives, and participles whether the word is masculine or feminine and whether it is singular or plural for a grammatical function, i.e., to refer to the indefiniteness of the term used. In addition, even in MSA, the CVVCC form does not always appear with the V(n) inflection (Ratcliffe 1998). It does sometimes appear as CVVCC with no inflection.
- The second reason for the problematic issue raised by his justification is the resultant CVV.C.C with two semi-syllables at the end. Btoosh suggested the process as follows: /ma:rr/ *passer-by* in Btoosh's view was once /ma:run/. It lost the (n) giving us /ma:rru/. The weak /u/ was also elided giving us the problematic /ma:rr/ with three moras. If the last two consonants are considered semi-syllables, then it can be assumed that there are two empty nuclei in the both semi-syllables CVV.C.C. This can be further illustrated by the following:

a) maarrun→ CVVCCV(n)

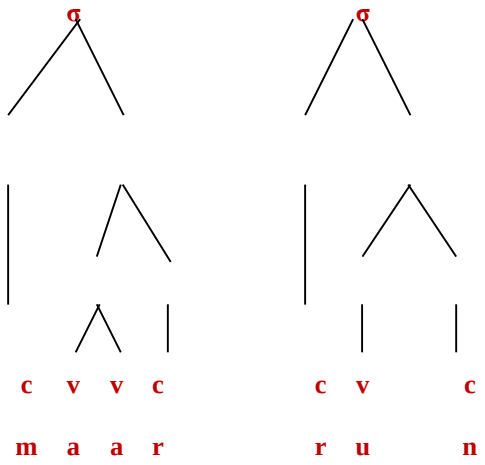

Figure 1

According to Btoosh, it is assumed that /maarrun/ lost its final /n/ and became /maarru/:

b) maarru→ CVVCCV

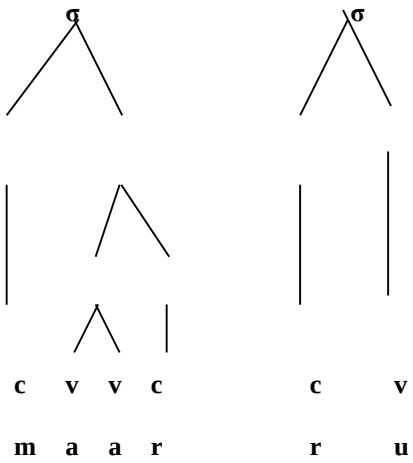

Figure 2

This in turns lost its vowel and became:

c) maarr→ CVVCC

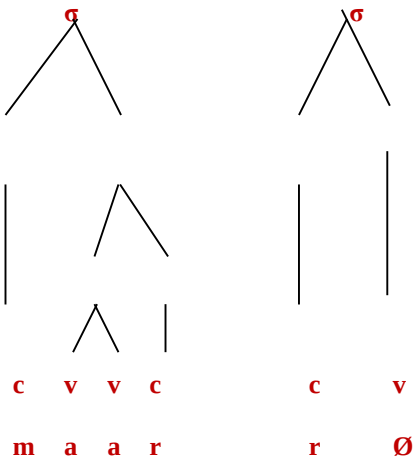

Figure 3

Because of the strong effect of the ***3μ** constraint and, as he stated, because the language allows two semi-syllable consonants in word-final position, the structure becomes:

d) maa.r.r→ CVV.C.C

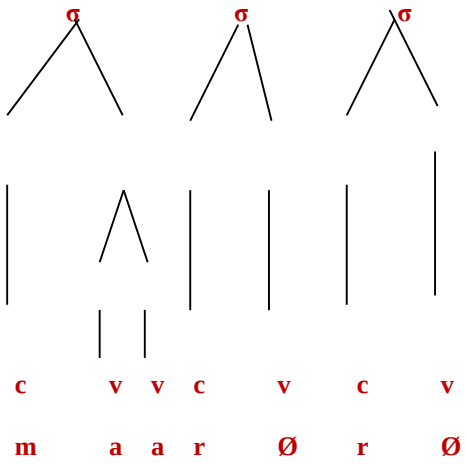

Figure 4

Btoosh claimed that speakers of Karaki Arabic like to adjoin the last unlicensed consonant to the coda rather than deleting it. This preference brings the syllable back to CVVCC. As a matter of fact, Btoosh's assumption of the CVVCC(vn) in MSA is the underlying structure of the Karaki CVVCC is questioned as its validity is difficult to check.

In addition to Karaki Arabic, which allows this CVVCC to surface, there is ample evidence that this structure is also used without resorting to any repair strategy in other Jordanian Arabic. Such dialects can be found in some villages in the northern part of Jordan, such as Jarash, and also in some villages in Palestine. The emergence of this CVVCC structure in such dialects can simply be attributed to the demotion of ***3µ**. Therefore, Table 7 below shows the hierarchy of the constraints in the grammar of those Karaki Arabic speakers and the speakers of other forms whose grammar allows the surface of CVVCC without resorting to any repair strategy:

Table 7: The Grammar Responsible for the Emergence of CVVCC

/mɑ:rr/	IDENT-IO[GEM]	*3 µ	W-MIN	*ComplexCoda	SON	DEP-V-IO	*GEM	*Coda
/ ma:r/	*!							*
→/ma:rr/		*		*	*		*	*
/ma:rir/	*!					*		*

The winning candidate is the second since it incurs a violation of the low ranked ***3µ**, while the other two candidates violate the highly ranked **IDENT-IO[GEM]** constraint.

So far, these are three strategies to which speakers of different Jordanian Arabic resort to in order to avoid the three moraic syllable CVVCC: degemination, vowel shortening, and adjoining unlicensed segments. The last strategy epenthesis (numbered as (iv) above) has been utilized as an explanation to account for people's attempt to get rid of the three moras in CVVCC resulting in CVVCVC in different Arabic dialects. Epenthesis has been justified differently by different researchers. Benhallam (1980), for instance, suggested that the Palestinian dialectal /sa:did/ *someone who closes* stemmed from the application of a morphological rule whose function is to ensure that the active participle sense of /sa:dd/ /sa:did/ is not confused with the past simple sense of /sadd/ *he closed*. He proposed a Geminate Law that allows a morphological rule to split an underlying geminate cluster and a phonological rule to split a derived geminate cluster. This leads to the need for further explanation of what is meant by the derived vs. natural cluster. Complex codas can be natural; that is, the coda

cluster is originally stemmed as a result of a phonotactic process. Alternatively, it can be derived. A derived coda cluster is a result of deleting a short-high unstressed vowel.

However, in some dialects in some villages in Jarash, for instance, /sa:dd/ surfaces as /sa:dd/ and is not only used for the third person singular masculine as Benhallam claimed, but also for the first person singular masculine and feminine as well as for the second person singular masculine to denote the active participle. This would question the validity of Benhallam's suggested Geminate Law.

Abu-Salim (1982) suggested that, in Palestinian Arabic, CVVCC is treated by epenthesis. The last two segments are broken up by a vowel – a process that yields CVVCVC. However, he claimed that one cannot consider CVVCC as the underlying form of CVVCVC because there is a prohibition against breaking up geminates in Palestinian Arabic. Abu-Salim agreed with Brame's (1971) suggestion that the epenthetic vowel is the underlying form of CVVCC.

In Ammani Arabic, the strategy that is used by Ammani speakers in their attempt to respect the highly ranked constraint ***3μ*** is also epenthesis**.** They use an epenthetic /i/ to split up the elements of the geminate in order to get rid of the trimoraic syllable in CVVCC. This results in CVV.CVC as is the case in /ħa:did/ *mourner* and /ma:rir/ *passer-by*. The tendency of breaking the geminate cluster by Ammani speakers can be explained from McCarthy's (1979, 1981) view. If his interpretation of the two different abstract tiers to which vowels and consonants are associated in nonconcatenative morphology in order to surface on the skeletal tier is adopted, then there is no violation of the No-Crossing Constraint. This is illustrated in the following figure:

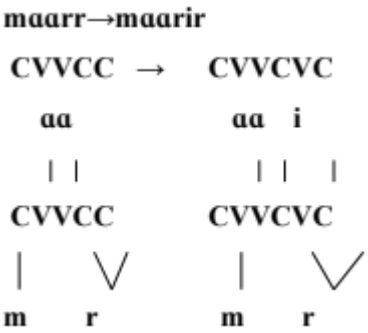

Figure 5

Hence, speakers of Ammani dialect resort to splitting the geminate cluster in CVVCC to abide by ***3μ***. Resorting to epenthesis is not at the expense of the No-Crossing Constraint.

From OT perspective, the insertion of a vowel between segments of a geminate entails that **DEP-V-IO** is violated but seems to be ranked below ***3μ***. This repair strategy has caused a severe violation of the highly respected constraint which entails the prohibition of splitting geminate clusters **IDENT-IO[GEM].**

Nonetheless, it is more convenient and more practical to put the inseparability of geminate at jeopardy than to resort to governmental phonology interpretation, or to come up with a rule that applies in one environment and another rule that applies in another, or even to take the risk of indulging in the abstractness of tiers and/or underlying representations. Consequently, it can be posited that CVVCC surfaces as CVVCVC in the speakers of Ammani as well as some Palestinian dialects to abide to ***3μ*** in spite of the severe violation of the universal **IDENT-IO[GEM].** However, this severe violation of **IDENT-IO[GEM]** is environmentally restricted. This environment in which the integrity hypothesis can be violated is when the geminates are word-final and preceded by a long vowel. Consequently, if the "No Splitting of Geminates

Hypothesis" adds the exceptional circumstance as in "except word-finally after a long vowel", this will be sufficient to justify the splitting of the geminates in Ammani Arabic as well as in other dialects. Hence, Ammani speakers produce CVVCVC instead of CVVCC as in /ma:rir/ *passer-by* instead of /ma:rr/.

As can be seen, from an OT perspective, if the constraint hierarchy in the grammar of those speakers of Ammani and Palestinian forms allows them to split a geminate cluster at the end of the word is preceded by a long vowel is adopted, ***3µ** should outrank **IDENT-IO[GEM].**

Therefore, Table 8 below shows the hierarchy of the constraints in the grammar of Ammani speakers and speakers of other Palestinian dialects with respect to the CVVCC structure.

Table 8:The Grammar Responsible for Repairing CVVCC

/mɑ:rr/	*3 µ	IDENT-IO[GEM]	W-MIN	SON	DEP-V-IO	*COMPLEX Coda	*GEM	*Coda
→/ma:r/		*						*
/ma:rr/	*!			*		*	*	*
→/ma:rir		*			*			*

Still, as can be inferred from the table above, two optimal candidates may be produced; however, this is not the case. Only the third candidate should win. This leads to the assumption that M**AX-IO** is ranked higher than **IDENT-IO[GEM].**

MAX-IO

Every segment in the input has a correspondence in the output.

(No deletion) (McCarthy & Prince, 1995)

This would make of the third candidate the only winner.

Table 9: The Grammar Responsible for Repairing CVVCC

/mɑ:rr/	*3 µ	MAX-IO	IDENT-IO[GEM]	W-MIN	SON	DEP-V-IO	*COMPLEXcoda	*GEM	*Coda
/ma:r/		*!	*						*
/ma:rr/	*!				*		*	*	*
→/ma:rir/			*			*			*

In Table 9 above, the first candidate violates the highly ranked constraint **MAX-IO**. The second candidate violates the highly ranked ***3µ**. This automatically means the third candidate wins as its violations are incurred in lower-ranked constraints.

Whatever method or whichever interpretation sounds plausible, this epenthesis process is triggered by prosodic reasons. Epenthesis between geminates would never have happened if there had been no prosodic reason to expect its occurrence (Ito 1989).

At this stage, one can posit that the grammar of speakers of Ammani Arabic which is responsible for the emergence of CVCC and the repair of CVVCC is shown in Table 10 below.

Table 10: The Grammar of the Forms of Arabic which Allow CVCC and Repair CVVCC

/kalb/	*3 µ	MAX-IO	IDENT-IO[GEM]	W-MIN	SON	DEP-V-IO	*COMPLEX Coda	*GEM	*Coda
→/kalb/							*		*
/kalib/						*!			*
/ʔabir/									
→/ʔabir/						*			*
/ʔabir/					*!		*		*
/ʕamm/									
→/ʕam/				*					*
/ʕamim/			*!						*
→/ʕamm/					*				*
/ma:rr/									
/ma:rr/	*!						*	*	*
/ma:r/		*	*						*
→/ma:rir/			*			*			*

Hence, the hierarchy of the grammar of Ammani people and speakers of some Palestinian dialects is as follows:

***3µ>>MAX-IO>>IDENT-IO[GEM]>>W-WIN>>SON>>DEP-V-IO>>*COMPLEXcoda>>*GEM>>*Coda**

CONCLUSIONS

A discussion of CVCC and CVVCC syllable structures in different dialects of JA has been introduced. With regard to CVCC, it can be noticed that coda clusters are allowed providing that the cluster respects the SSP in Ammani and Karaki Arabic. However, they are attested in Ajluni Arabic if and only if the clusters are formed of a geminate.

CVVCC, however, is a more complicated issue since it violates the bimoracity nature of the Arabic syllable structure. Repair strategies suggested in different previous studies have been discussed. An environment in which the universal constraint that militates against splitting geminate by epenthesis can be violated has been suggested. A comparison has been made between the ways speakers of different forms of Arabic avoid this three-mora syllable. Finally, a comparison between the ways CVVCC was handled in different Arabic forms has been introduced within the framework of OT.

APPENDIX

- **Consonants and Vowels in Jordanian Arabic**

  The twenty eight consonants in Jordanian Arabic are illustrated in the list below:

  /b/ labial voiced stop

  /t/ dental voiceless stop

  /d/ dental voiced stop

  /T/ dental emphatic voiceless stop

  /D/ dental emphatic voiced stop

  /k/ velar voiceless stop

  /g/ velar voiced stop

/ʔ/ glottal voiceless stop

/m/ labial voiced nasal stop

/n/ alveolar voiced nasal stop

//f/ labiodental voiceless fricative

/θ/ dental voiceless fricative

/ð/ dental voiced fricative

/ð̣/ dental emphatic voiced fricative

/s/ alveolar voiceless fricative

/z/ alveolar voiced fricative

/S/ alveolar emphatic voiceless fricative

/ʃ/ alveo-palatal voiceless fricative

/dʒ/ alveo-palatal voiced fricative

/χ/ uvular voiceless fricative

/ɣ/ uvular voiced fricative

/ħ/ pharyngeal voiceless fricative

/ʕ/ pharyngeal voiced fricative

/h/ glottal voiceless fricative

/l/ alveolar voiced liquid

/r/ alveolar voiced liquid

/w/ labial voiced glide

/j/ palatal voiced glide

- **Vowel Inventory in Jordanian Arabic**

The nine vowels in Jordanian Arabic are illustrated in the list below;

/i:/ high front long vowel

/i/ mid-high front short vowel

/u:/ high back long vowel

/ʊ / mid-high back short vowel

/e:/ mid-low front long vowel

/ɔ:/ mid-low back long vowel

/ɔ/ mid-low back short vowel

/a:/ low front long vowel

/a/ low front short vowel

REFERENCES

1. *Abdel-Jawad, Hasan (1986) The Emergence of an Urban Dialect in the Jordanian Urban Centres. International Journal of the Society of Language 61, pp.53-63. DOI :https ://doi.org/10.1515 /ijsl.1986.61.53.*
2. *Abu Salim, Issam (1982) Syllable Structure and Syllabification in Palestinian Arabic. Studies in the Linguistic Sciences 12 (19), pp 1- 28.*
3. *AbuAbbas, Khaled Hasan (2003) Topics in the Phonology of Jordanian Arabic: an Optimality Theory Perspective. PhD Dissertation. University of Kansas.*
4. *Al-Sughayer, Khalil Ibrahim (1990) Aspects of Comparative Jordanian and Modern Standard Arabic Phonology. PhD Dissertation. Michigan State University. USA.*
5. *Al-Wer, Enam (2007) Jordanian Arabic (Amman). In KessVersteegh (ed.) Encyclopedia of Arabic Language and Linguistics 2, pp. 501- 517. Leiden: Brill.*
6. *Benhallam, Abderrafi (1980) Syllable Structure and Rule Types in Arabic. PhD Dissertation. University of Florida.*
7. *Brame, Michael K. (1971) Review Article "Stress in Arabic and Generative Phonology" Review of Daud A. Abdo. "On Stress and Arabic Phonology A Generative Approach" PhD Dissertation. Foundation of Language 7, pp. 556-591.*
8. *Broselow, Ellen (1995) Skeletal Positions and Moras. In John A. Goldsmith (ed.) The Handbook of Phonological Theory, pp. 175- 205. Cambridge, Mass. : Blackwell.*
9. *Broselow, Ellen, Marie Huffman, Sue Chen, and Ruchmei Hsieh (1995) The Timing Structure of CVVC syllables. In Mushira Eid (ed.) Perspectives on Arabic Linguistics VII, pp 119-138. Amsterdam and Philadelphia, John Benjamins.*
10. *Broselow, Ellen, Su-I Chen, and Marie Huffman (1997) Syllable Weight: Convergence of Phonology and Phonetics. Phonology 14, pp. 47-82.*
11. *Btoosh, Mousa A. (2006) Constraint Interactions in Jordanian Arabic Phonotactics: An Optimality-Theoretic Approach. Journal of Language and Linguistics 5 (2), pp. 102- 221.*
12. *Clements, G. N. (1990) The Role of the Sonority Cycle in Core Syllabification. In Kington, J. and Beckman, M. E. (eds.) Papers in Laboratory Phonology I: Between the Grammar and Physics of Speech pp. 283-333. Cambridge: Cambridge University Press.*
13. *Daana, Hana A. (2009) The Development of Consonant Clusters, Stress and Plural Nouns in Jordanian Arabic Child Language. PhD Dissertation. University of Essex: UK.*
14. *El-Badarin, Mohammed and Raslan Bani-Yasin (1993) Consonant Clusters in Northern Jordanian Arabic Dialect. Language Research 29 (2), pp. 201- 242.*

15. *Ito, Junko (1989) A Prosodic Theory of Epenthesis. Natural Language and Linguistic Theory 7, pp. 217- 260.*
16. *Kager, R. (1999) Optimality Theory. Cambridge: Cambridge University Press.*
17. *Kenstowicz, M. (1995) Base- Identity and Uniform Exponence. Alternatives to Cyclicity. MS.MIT: ROA-103 Rutgers Optimality Theory.*
18. *Kiparsky, Paul (2003) Syllables and Moras in Arabic. In Caroline Ferry and Ruben Var De Vijver (eds.) The Syllable in Optimality Theory. Cambridge University Press: Cambridge.*
19. *McCarthy, J. (1979) On Stress and Syllabification. Linguistic Inquiry 10, pp. 443-466.*
20. *McCarthy, J (1981) A Prosodic Theory of Nonconcatinative Morphology. Linguistic Inquiry 12, pp. 373- 418.*
21. *McCarthy, J. and A. Prince (1990) Prosodic Morphology and Templatic Morphology. In Eid, M. and John McCarthy (eds.), Perspectives on Arabic Linguistics II, pp. 1-54.*
22. *McCarthy, J. and A. Prince (1995) Faithfulness and Reduplicative Identity. In Beckman, J. N., Dickey, L. W. and Urbanczyk, S. (eds.) Papers in Optimality Theory. University of Massachusetts Occasional Papers in Linguistics 18. pp. 249-384.*
23. *Prince, A. and Paul Smolensky (2004) Optimality Theory. Blackwell Publishing Company. UK.*
24. *Ratcliffe, Robert R. (1998) The Broken Plural Problem in Arabic and Comparative Semitic. John Benjamin Publishing Company. Amsterdam.*
25. *Tayeh, Q. Daana, H. and Tahaineh, Y. (2012) Consonant Clusters in Toulkarim Plaestenian Dialect. European Journal of Scientific Research 88 (1) 45-84.*