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Consonantal Assimilation in Four Dialects of Jordanian Arabic

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Abstract
The current study investigates assimilation between consonants across word boundaries in four dialects of Jordanian Arabic. Sixteen native speakers of the 4 dialects provided the production part (four from each dialect). Another 16 trained listeners heard the phrases, and readings were transcribed. The paper reports a number of asymmetries along the dimensions of place, manner, voicing and directionality. These asymmetries are corresponding to earlier typological works in the literature (e.g. Mohanon, 1993; Jun, 1995) and a few which are not. The study presents rich linguistic data, contributing as the basis for a valuable cross-dialectal study of consonant assimilation in JA. Consonant assimilation in the four dialects provides excellent support for the results of some previous studies on assimilation in consonant clusters.

Key words: Arabic dialects; Consonant assimilation; Place; Manner; Voicing

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INTRODUCTION

Phonological assimilation (a speech feature resembling another feature in a neighboring segment in less careful speech) has been viewed as a purely linguistic phenomenon (Kohler, 1991 & 1992; Mohanan, 1993; Hansson, 2001; Rose & Walker, 2004, Jun 1995 & 2005, and many others). Phonological assimilation occurs either within a word or across words. It may occur between vowels, between consonants, or between vowels and consonants. A wide spectrum of features may be involved in the process such as place, manner, voicing, vowel height, vowel rounding, and nasalization. The phenomenon is found in many languages (English, Arabic, Catalan, Korean, and many other languages). Assimilation is accounted for by underspecification theory, by feature geometry, and by generative phonology. In OT, it is viewed as the competition between Faithfulness and Markedness constraints for both articulatory and perceptual constraints, see Steriade (1995, 2001), Myers (1997), and Boersma (1998). The purpose of the current study is to demonstrate that a complete account of assimilation is supposed not only to include all factors governing the linguistic process to occur and to be licensed, but also to specify when the blocking process may occur. In this study, we examine consonant place assimilation together with voicing and emphasis in four different regional dialects of Jordanian Arabic (JA). The main goal of the paper is to present a comprehensive data source for the assimilation behavior in the language. Although it is not possible to draw neat boundaries within Jordanian Arabic, it consists of four regional dialects: Ammani Dialect (AD) is spoken in the capital city by almost 2 million people who are dialectally analogous to Palestinian Arabic, RNUD is spoken by another 2 million people who are considered native village dwellers especially in the northern part of the country, GD is spoken by black farmers, almost 1 million, in the Jordan valley area, and BD is spoken by nomadic tribes, 1 million, in the desert area from the northern to southern side.

1. METHOD AND DATA

To investigate the patterns of consonant assimilation in JA, the researchers created phrases that represent all C1C2 combinations (C1≠C2) across word -boundaries. Given that JA has 28 consonants, and [j] and [w] do not occur in word-final position, there are a total of (28-2)*(28-1) =702 phrases for each dialect. All C_1C_2 clusters are intervocalic. Since the four dialects may differ in the lexicon, other phrases were constructed when needed. BD, for instance, breaks consonant cluster by inserting [ɪn] suffix at the end of some nouns but not in the possessive structure (of-structure) and not in verbs - this required using different phrasal structure.

Four native speakers (2 males and 2 females) from each dialect (AD), (RNUD), (GD), and (BD) produced the phrases and stimuli were recorded. The judgment of whether assimilation has occurred is made by 4 native listeners from each dialect, too. Participants were asked to read the list of phrases at a normal speaking rate and to repeat the phrase three times. Assimilation was considered present only if the percentage of assimilated tokens exceeded 60%. When assimilation occurs, we provide data for each dialect. But if they all agree not to assimilate, only RNUD will be illustrated. In the following two sections, we report the results for stem-stem assimilation. Data will depend mainly on (RNUD) since it is spoken by the native village dwellers and is totally independent from Palestinian Arabic. Yet, if other dialects show any differences in the patterns from the one found in (RNUD), they will be illustrated in relevant sections. We hypothesize that similar assimilation patterns across dialects are consistent with typological constraints and divergence across the four dialects is caused by speech rate since it is considered to be an important difference across JA dialects. One phonetic feature common to all Arabic dialects is the presence of the so-called emphatic consonants, written here as [cˤ]. These consonants are produced with a secondary constriction in the posterior vocal tract (Lehn 1963, Al-Ani 1970, Card 1983, Davis 1995, Zawaydeh 1999, Watson 2002, among others).

1.1 C1=noncoronal and C_2=coronal

1.1.1 Place Assimilation

Labials and dorsals are never targeted by coronals for place assimilation in RNUD, GD, AD, and BD1 (with nouns) and BD2 (with verbs) as shown by the following examples:

D1.
RNUD:/kalaam naagɪsˤ/ [kalaam naagɪsˤ]
'incomplete speech'
GD:/tʃalaam naagɪsˤ/ [tʃalaam naagɪsˤ]
'incomplete speech'
AD: /kalaam naaʔɪsˤ/ [kalaam naaʔɪsˤ]
'incomplete speech'
BD1: /tʃalaamɪn naagsˤɪn/ [tʃalaamɪn naagsˤɪn]
'incomplete speech'
BD2:/sim nahaar/ [sim nahaar]
'fast a day'

More examples on labials and dorsals from RNUD:

D2. /kalaam raagi/ [kalaam raagi]
'elegant speech'
D3. /kalaam taarixi/ [kalaam taarixi]
'historic speech'
D4. /kalaam safih/ [kalaam safih]
'trivial speech'
D5. /ʕalaf naadʒɪħ/ [ʕalaf naadʒɪħ]
'successful fertilizer'
D6. /ʕalaf naaʔɪm/ [ʕalaf naaʔɪm]
'a soft fertilizer'
D7. /ʕalaf tɪdʒaari/ [ʕalaf tɪdʒaari]
'commercial fertilizer'
D8. /ʕalaf saaxɪn/ [ʕalaf saaxɪn]
'a warm fertilizer
D9. /galb daafi/ [galb daafi]
'a warm heart'
D10. /sɪlɪk taalɪf/ [sɪlɪk taalɪf]
'a torn wire'
D11. /malɪk daahjɪ/ [malɪk daahjɪ]
'a shrewd king'
D12. /farg ʃaasɪʕ/ [farg ʃaasɪʕ]
'a big difference'
D13. /ħarb sahlɪ/ [ħarb sahlɪ]
'an easy war'

1.1.2 Voicing Assimilation

Labials and dorsals are never targeted by coronals for voicing assimilation, as illustrated by examples D3-D6 and D11-D13. This is also true for other dialects.

1.1.3 Emphasis Assimilation

Unsurprisingly, labials and dorsals, also true for other dialects, are never targeted by coronals for emphasis assimilation, as emphatic labials and dorsals are not part of JA's consonant inventory. This is shown in D14-D15.

Dl4. /kalaam sˤabi/ [kalaam sˤabi]
'a boy's speech'
D15. /sarag sˤabi/ [sarag sˤabi]
'he rubbed a boy'

1.2 C1 and C_2=noncoronals

1.2.1 Place Assimilation

Place assimilation does not occur if the two adjacent consonants are both noncoronals. This is shown in D16-D21.

D16.
RNUD: /ħag ɣanamɪ/ [ħag ɣanamɪ]
'the price of a goat'
GD: /ħag ɣanama/ [ħag ɣanama]
'the price of a goat'
AD: /ħaʔ ɣanamɪ/ [ħaʔ ɣanamɪ]
'the price of a goat'
BD: /ħag ɣnɪmtɪn/ [ħag ɣnɪmtɪn]

'the price of a goat'

More examples on adjacent noncoronals from RNUD:

D17. /galb gaasi/ [galb gaasi]
'a ruthless heart'

D18. /faraaɣ kulli/ [faraaɣ kulli]
'a full blankness'

D19. /ħub faani/ [ħub faani]
'a fading love'

D20. /raf baali/ [raf baali]
'a shabby shelf'

D21. /sɪlɪk baali/ [sɪlɪk baali]
'a smashed wire'

1.2.2 Voicing Assimilation

If two adjacent noncoronal sounds differ only in voicing, they undergo voicing assimilation. But when they differ in any other features, then voicing assimilation is blocked. The non-application of voicing assimilation is illustrated by examples D18-D21. Voicing assimilation is shown in D22-D23.

D22.

RNUD: /ħag kaamɪl/ [ħak kaamɪl]
'a complete right'

GD: /ħag tʃaamɪl/ [ħag tʃaamɪl]
'a complete right'

AD: /ħaʔ kaamɪl/ [ħaʔ kaamɪl]
'a complete right'

BD1: /ħagɪn tʃaamlɪn/ [ħagɪn tʃaamlɪn]
'a complete right'

BD2: /marag kamɪl/ [marak kamɪl]
'Kamil passed by'

D23.

RNUD: /tˤax ɣanamɪ/ [tˤaɣ ɣanamɪ]
'he shot a goat'

GD: /tˤax ɣanama/ [tˤaɣ ɣanama]
'he shot a goat'

AD: /tˤax ɣanamɪ/ [tˤaɣ ɣanamɪ]
'he shot a goat'

BD: /tˤax ɣnɪmtɪn/ [tˤaɣ ɣnɪmtɪn]
'he shot a goat'

1.2.3 Emphasis Assimilation

Given that emphatic labials and dorsals are not part of JA's consonant inventory, emphasis assimilation is not relevant here.

1.3 C1=coronal and C_2=noncoronal

1.3.1 Place Assimilation

When C_1 is a coronal nasal /n/, it assimilates in place to a following labial or velar stop (oral or nasal), as shown in examples D24-D27. This occurs in all dialects except for AD and in the case of nouns ending with /In/ in BD.

D24.

RNUD: /tin baladi/ [tim baladi]
'local fig'

GD: /tin baladi/ [tim baladi]
'local fig'

AD: /tin baladi/ [tin baladi]
'local fig›

BD1: /tinin baladi/ [tinin baladi]
'local fig'

BD2: /zin baʕad/ [zim baʕad]
'put more'

More examples from RNUD:

D25. /den majjit/ [dem majjit]
'a dead loan'

D26. /laban kamɪl/ [labaŋ kamɪl]
'Whole yogurt'

D27. /dʒɪbɪn gaasi/ [dʒɪbɪŋ gaasi]
'solid cheese'

In all dialects, a coronal nasal /n/ does not assimilate in place to a following fricative, as shown in D28-D29, illustrations are from RNUD.

D28. /laban fawwaar/ [laban fawwaar]
'a boiling yogurt'

D29. /den xasraan/ [den xasraan]
'a lost loan'

Unsurprisingly, /n/ does not assimilate in place to a following pharyngeal /ħ/ or /ʕ/, as a pharyngeal nasal is articulatorily impossible. This is shown in D30-D31.

D30. /laban ħaami/ [laban ħaami]
'a very hot yogurt'

D31. /laban ʕaadi/ [laban ʕaadi]
'a plain yogurt'

Coronal plosives /t, d, tˤ, dˤ/ do not assimilate in place to a following labial nasal as seen in D40-D41, but not to a velar plosive, as in D32-D39. And as we can see in D33-D35, voicing and emphasis assimilation also occur concomitantly when place assimilation occurs. But this does not occur in AD and BD. Notice that JA does not have a velar nasal [ŋ] underlyingly.

D32.

RNUD: /samaad baladi/ [samaab baladi]
'national fertilizer'

GD: /samaad baladi/ [samaab baladi]
'national fertilizer'

AD: /samaad baladi/ [samaad baladi]
'national fertilizer'

BD: /sɪmaadɪn baladi/ [sɪmaadɪn baladi]
'national fertilizer'

BD: /ʔɪgʕɪd bɪʕid/ [ʔɪgʕɪd bɪʕid]
'sit down far-off'

More examples from RNUD

D33. /zet baladi/ [zeb baladi]
'a local oil'

D34. /matˤaatˤ baladi/ [matˤaab baladi]
'national rubber'

D35. /bedˤ baladi/ [beb baladi]
'local eggs'

D36. /bet karim/ [bet karim]
'a generous family'

D37. /matˁaatˁ kamɪl/ [matˁaatˁ kamil]
'pure rubber'
D38. /samaad gaasi/ [samaad gaasi]
'a solid fertilizer'
D39. /bedˁ gaasi/ [bedˁ gaasi]
'solid eggs'

Coronal plosives /t, d, tˁ, dˁ/ do not assimilate in place to a following labial nasal, as seen in D40-D41. Notice that JA does not have a velar nasal [N] underlyingly.

D40. /naadat marra/ [naadat marra]
'she called once'
D41. /marrat maraa/ [marrat maraa]
'a woman passed by'

Coronal plosives /t, d, tˁ, dˁ/ do not assimilate in place to a following noncoronal fricative, as illustrated in D42-D47.

D42. /bet fluus/ [bet fluus]
'a rich family'
D43. /matˁaatˁ faalɪt/ [matˁaatˁ faalɪt]
'a loose rubber'
D44. /samaad fawwaar/ [samaad fawwaar]
'a strong fertilizer'
D45. /bedˁ faasɪd/ [bedˁ faasɪd]
'rotten eggs'
D46. /bet xaali/ [bet xaali]
'an empty house'
D47. /bet ɣaali/ [bet ɣaali]
'an expensive house'

Coronal fricatives do not assimilate in place to a following noncoronal, as shown in D48-D50.

D48. /θalaθ barakaat/ [θalaθ barakaat]
'three blessings'
D49. /kis banduura/ [kis banduura]
'a bag of tomatoes'
D50. /kis kuusa/ [kis kuusa]
'a bag of squash'

Finally, nonnasal coronal sonorants /l,r/ do not assimilate to a following noncoronal, as shown in D51-D54.

D51. /lel kaalɪħ/ [lel kaalɪħ]
a very dark night'
D52. /lel baraka/ [lel baraka]
'a blessed night'
D53. /dar kamlɪh/ [dar kamlɪh]
'the entire house'
D54. /dar balad/ [dar balad]
'a huge house'

1.3.2 Voicing Assimilation

Voice assimilation between a coronal C_1 and a noncoronal C_2 occurs on condition that C_1 assimilates in place to C_2. This is illustrated by examples D33-D34. Given that place assimilation only occurs when both C1 and C2 are oral stops, this observation is in line with the generalization that voicing assimilation only occurs when all other surface features of the two consonants are identical (cf. §1.2.2). The only underlying feature that may differ between C1 and C2 without blocking voicing assimilation is emphasis. See §1.3.3 on emphasis assimilation below.

1.3.3 Emphasis Assimilation

Emphasis assimilation also only occurs between a coronal C_1 and a noncoronal C_2 when place assimilation also occurs. Therefore, similarly to voicing assimilation, emphasis assimilation only occurs when all other surface features of the two consonants are identical. Given that only coronal consonants can be emphatic, the emphasis assimilation here equates de-emphasis.

1.3.4 Interim Summary

Before delving into the more complex assimilation patterns between two coronals, we summarize the patterns of place assimilation seen so far. There are clear asymmetries regarding both triggers and targets along the dimensions of place and manner, and they are generally in line with the implicational hierarchies of Mohanan's and Jun's. These asymmetries are summarized in (1)-(5).

(1) Target manner:
a. Nasals are more likely targets than stops.
b. Stops are more likely targets than fricatives and nonnasal sonorants.
(2) Target place:
Coronals are more likely targets than noncoronals.
(3) Trigger manner:
a. Stops are better triggers than nasals.
b. Nasals are better triggers than fricatives.
(4) Trigger place:
a. Labials are better triggers than velars.
b. Velars are better triggers than coronals.
(5) Position of target:
C_1 assimilates to C_2.

As we can see, these asymmetries are generally consistent with the implicational hierarchies established by Mohanan (1993) and Jun (2005). Two patterns not predicted by, but also not in conflict with, the existing implicational statements are that nasals are better triggers than fricatives, and that labials are better triggers than velars. Jun (2005) does not commit to a comparison between nasals and fricatives or between labials and velars in their ability to trigger place assimilation. Neither Mohanan's nor Jun's works discuss patterns of what we call "minor place assimilation"—assimilation between two coronal consonants that differ slightly in place, e.g., alveolar vs. palatoalveolar. The following section discusses cases of minor place assimilation in JA. To preview the findings, we show that (a) place assimilation is more likely to happen when the sonorancy of the two consonant matches; (b) there are a number of asymmetries regarding triggers and targets of place assimilation; and (c) voicing and emphasis assimilation occur when the places of the two consonants

are identical, either underlyingly or as a result of minor place assimilation.

1.4 C1 and C_2=coronals

1.4.1 Place Assimilation

Now we will consider coronal sounds from three different passive articulators: interdental, alveolar, and palatoalveolar. If two adjacent coronal sounds do not agree in sonorancy, no assimilation occurs. If the adjacent coronals agree in sonorancy, minor place assimilation occurs — which triggers voicing and emphasis assimilations, rendering the two coronals identical. This total assimilation has the following exceptions. First, nonnasal sonorants /l/ and /r/ do not assimilate to the nasal /n/. Second, /r/ does not assimilate to /l/. Third, strident coronals /s, z, sˤ, ʃ, ʤ/ do not assimilate to nonstrident coronals /t, tˤ, d, dˤ, ð, ðˤ, θ/. Fourth, within stridents, palatoalveolars /ʃ, ʤ/ do not assimilate to alveolars /s, sˤ, z/. Fifth, within palatoalveolar stridents, the affricate /ʤ/ does not assimilate to the fricative /ʃ/. We illustrate these generalizations in turn below.

Examples D55-D60 show that when two coronals disagree on sonorancy, no assimilation takes place and this applies to the four dialects.

D55. /sˤaar ʃab/ [sˤaar ʃab]
'he became a chap'

D56. /ʃaaʃ raasi/ [ʃaaʃ raasi]
'bandage for head'

D57. /tin ʤabali/ [tin ʤabali]
'mountain's figs'

D58. /sardʒ naaʔɪm/ [sardʒ naaʔɪm]
'a soft saddle'

D59. /lel daafi/ [lel daafi]
'a warm night'

D60. /ward laamɪʔ/ [ward laamɪʔ]
'shining roses'

Within sonorants, nonnasals trigger total assimilation of the nasal /n/, but not vice versa, as shown in D61-D64. This occurs in AD and BD. However, the process also involves the opposite where nasals trigger assimilation in nonnasals (RNUD and GD).

D61.
RNUD /min ramaaha/ [mir ramaaha]
'who threw it?'
GD /min ramaaha/ [mir ramaaha]
'who threw it?'
AD /min ramaaha/ [mir ramaaha]
'who threw it?'
BD /man ramaaha/ [mɑr ramaaha]
'who threw it?'

D62.
RNUD /tin lɪbnaani/ [til lɪbnaani]
'Lebanese figs'
GD /tin lɪbnaani/ [til lɪbnaani]
'Lebanese figs'
AD /tin lɪbnaani/ [tɪl lɪbnaani]
'Lebanese figs'
BD /zin laban/ [zil laban]
'weigh the yogurt

D63.
RNUD /sˤaar naajɪm/ [sˤaan naajɪm]
'he became asleep'
GD /sˤaar naajɪm/ [sˤaan naajɪm]
'he became asleep'
AD /sˤaar naajɪm/ [sˤaar naajɪm]
'he became asleep'
BD /sˤaar naajɪm/ [sˤaar naajɪm]
'he became asleep'

D64.
RNUD/ʃɪl nadɪr/ [ʃɪn nadɪr]
'pick up Nadir'
GD /ʃɪl nadɪr/ [ʃɪn nadɪr]
'pick up Nadir'
AD /ʃɪl nadɪr/ [ʃɪl nadɪr]
'pick up Nadir›
BD /ʃɪl nadɪr/ [ʃɪl nadɪr]
'pick up Nadir'

Within nonnasal sonorants, /l/ assimilates to /r/, but not *vice versa*, as shown in D65-D66.

D65.
RNUD/ mal raasak/ [mar raasak]
'what's wrong with your head›
GD / mal raasak/ [mar raasak]
'what's wrong with your head›
AD / mal raasak/ [mar raasak]
'what's wrong with your head›
BD / mal raasak/ [mar raasak]
'what's wrong with your head›

D66.
RNUD/sˤaar lɪbnaani/ [sˤaar lɪbnaani]
'he became Lebanese'
GD /sˤaar lɪbnaani/ [sˤaar lɪbnaani]
'he became Lebanese'
AD /sˤaar lɪbnaani/ [sˤaar lɪbnaani]
'he became Lebanese'
BD /sˤaar lɪbnaani/ [sˤaar lɪbnaani]
'he became Lebanese'

Within nonsonorants, nonstridents assimilate to stridents (D67-D71), but not *vice versa* (D72-D76). Assimilation is total in that minor place assimilation is accompanied by both emphasis assimilation (D69) and voicing assimilation (D71). The process is clear in RUND and GD. In AD allophonic changes block the process where /θ/ becomes /t/ or /s/ and / ð/ becomes /d/. The process doesn't occur in BD.

D67.
RNUD /hadiθ ʃaajɪʔ/ [hadiʃ ʃaajɪʔ]
'a common talk'
GD /hadiθ ʃaajiʔ/ [hadiʃ ʃaajɪʔ]
'a common talk'
AD /ʔatat ʃaami/ [ʔatat ʃaami]

‹Syrian furniture›

BD /uħruθ ʃaarɪʕ/ [uħruθ ʃaarɪʕ]
'plough a street'

D68. /fulaað zjaadɪ/ [fulaaz zjaadɪ]
'extra steel'

D69. /θaalɪθ sabi/ [θaalɪsʕ sʕabi]
'the third boy'

D70. /ħadiθ saaħɪr/ [ħadis saaħɪr]
'a magical talk'

D71. /ħadiθ zaajɪf/ [ħadiz zaajɪf]
'a fake event'

D72.

RNUD/ʃaaʃ θaani/ [ʃaaʃ θaani]
'another tissue'

GD /ʃaaʃ θaani/ [ʃaaʃ θaani]
'another tissue'

AD /ʃaaʃ taani/ [ʃaaʃ taani]
'another tissue'

BD /ʃaaʃ θaani/ [ʃaaʃ θaani]
'Thani went high'

D73. /gazaaz ðaajɪb/ [gazaaz ðaajɪb]
'a melting glass'

D74. /lisˤ θaani/ [lisˤ θaani]
'another thief'

D75. /kaas θaani/ [kaas θaani]
'another cup'

D76. /ħɪz θaani/ [ħɪz θaani]
‹another slice'

Within stridents, alveolars assimilate to palatoalveolars (D77-D78), and *vice versa* (D79-D80). This occurs in RNUD and GD but not in AD nor in BD. Notice that in D78, voicing and emphasis assimilation occur concurrently with place assimilation; moreover, since JA does not have /ʒ/ and /tʃ/, assimilation of the [continuant] feature is forced by structure preservation in D78.

D77.

RNUD/kaas ʃaraab/ [kaaʃ ʃaraab]
'a glass of juice'

GD /kaas ʃaraab/ [kaaʃ ʃaraab]
'a glass of juice'

AD /kaas ʃaraab/ [kaas ʃaraab]
'a glass of juice'

BD /kaas ʃaraab/ [kaas ʃaraab]
'a glass of juice'

D78. /xalasˤ dʒɪdaal/ [xaladʒ dʒɪdaal]
'enough of dispute'

D79.

RNUD /ʃaaʃ saalim/ [ʃaas saalim]
'whole tissue'

GD /ʃaaʃ saalim/ [ʃaas saalim]
'whole tissue'

AD /ʃaaʃ saalim/ [ʃaaʃ saalim]
'whole tissue'

BD /ʃaaʃ saalim/ [ʃaaʃ saalim]
'whole tissue'

D80. /ħadʒ sˤajjaad/ [ħadʒ sˤajjaad]
'a skillful hunter'

Within palatoalveolar stridents, the fricative /ʃ/ assimilates completely to the affricate /dʒ/, and *vice versa* in both RNUD and GD, as in D81-D82. in AD, /dʒ/ is always pronounced /ʒ/.

D81.

RNUD/balaaʃ dʒɪdaal/ [balaadʒ dʒɪdaal]
'stop disputing'

GD /balaaʃ dʒɪdaal/ [balaadʒ dʒɪdaal]
'stop disputing'

AD /balaaʃ ʒɪdaal/ [balaaʒ ʒɪdaal]
'stop disputing'

BD /dʒat θaanya ʔ [dʒaθ θaanya]
'she came again'

D82.

RNUD/faradʒ ʃaamɪl/ [faraʃ ʃaamɪl]
'a total relief'

GD /faradʒ ʃaamɪl/ [faraʃ ʃaamɪl]
'a total relief'

AD /faradʒ ʃaamɪl/ [faraʒ ʃaamɪl]
'a total relief'

BD /faradʒ ʃaamɪl/ [faradʒ ʃaamɪl]
'a total relief'

Within nonstrident obstruents, all segments are triggers and targets of total assimilation (place, voice, and emphasis), as shown in D83-D98. We also observe the assimilation of [continuant] due to structure preservation in all these data. In AD, nonstrident obsturents are pronounced with a sibilant allophone.

D83.

RNUD/bet θaani/ [beθ θaani]
'a second house'

GD /bet θaani/ [beθ θaani]
'a second house'

AD /bet t/s aani/ [bet t/s aani]
'a second house'

BD /dʒat θaanya/ [dʒaθ θaanya]
'a second house'

D84. /harraaθ taʕbaan/ [harraat taʕbaan]
'a tired farmer'

D85. /rad ðalil/ [rað ðalil]
'a weak answer'

D86. /malaað daafi/ [malaad daafi]
'a warm shelter'

D87. /arðˤ dˤaawjɪ/ [ardˤ dˤaawjɪ]
'a glowing land'

D88. /bedˤ ðˤaamɪr/ [beðˤ ðˤaamɪr]
'small eggs'

D89. /dʒaatˤ θuum/ [dʒaaθ θuum]
'a garlic-full dish'

D90. /gararaat ðˤaalmɪ/ [gararaaðˤ ðˤaalmɪ]
'unfair decisions'

D91. /ʃartˤ ðˤaahɪr/ [ʃarðˤ ðˤaahɪr]
'a clear provision'

D92. /xatˤ ðɪbbaan/ [xað ðɪbbaan]
'a line of flies'
D93. /fulaað dˤaruuri/ [fulaadˤ dˤaruuri]
'basic steel'
D94. /fulaað daaʔɪm/ [fulaad daaʔɪm]
'a supporting steel'
D95. /ħaðˤ daajɪm/ [ħad daajɪm]
'a lasting luck'
D96. /ɣaliðˤ dam/ [ɣalid dam]
'he is not kind'
D97. /walad ðˤaalɪm / [waladˤ ðˤaalɪm]
'a brainteaser boy'
D98. /laðið dˤaawi/ [laðidˤ dˤaawi]
'nice & complacent'

1.4.2 Voicing and Emphasis Assimilation

As we have seen in the previous section, when C_1 and C_2 are both coronal obstruents, voicing and emphasis assimilation occur if minor place assimilation also occurs. The following data exemplify the application of voicing and emphasis assimilation when the places of the two consonants are identical underlyingly.

D99.
RNUD/bas zalamɪ/ [baz zalamɪ]
'but he is a man'
GD /bas zalamɪ/ [baz zalamɪ]
'but he is a man'
AD /bas zalamɪ/ [baz zalamɪ]
'but he is a man'
BD /raas zalamɪ/ [raaz zalamɪ]
'a head of a man'
D100. /ħɪz saalɪm/ [ħɪs saalɪm]
'a complete slice'
D101. /nusˤ zalamɪ/ [nuz zalamɪ]
'half a man'
D102. /xubɪz sˤaadʒ/ [xubɪsˤ sˤaadʒ]
'a traditional bread'
D103. /nusˤ saalɪm/ [nus saalɪm]
'half safe'
D104. /bas sˤajjaad/ [basˤ sˤajjaad]
'but he is a hunter'
D105. /bet tˤawaabɪg/ [betˤ tˤawaabɪg]
'a multi-level house'
D106. /balad dˤabaab/ [baladˤ dˤabaab]
'a country of fog'
D107.
RNUD/bas sˤaajɪm/ [basˤ sˤaajɪm]
'just fasting'
GD /bas sˤaajɪm/ [basˤ sˤaajɪm]
'just fasting'
AD /bas sˤaajɪm/ [basˤ sˤaajɪm]
'just fasting'
BD /bas sˤaajɪm/ [basˤ sˤaajɪm]
'just fasting'
D108. /malaað ðˤaalɪm/ [malaaðˤ ðˤaalɪm]
'unfair shelter'
D109. /arðˤ ðablaanɪ/ [arð ðablaanɪ]
'a dry land'
D110. /bet din/ [bed din]
'a religious family'
D111. /bas zalamɪ/ [baz zalamɪ]
'but a man'
D112. /ħadiθ ðɪkɪr/ [ħadɪð ðɪkɪr]
'a religious talk'

1.4.3 Interim Summary

When C_1 and C_2 are both coronals, we have observed that minor place assimilation only occurs when the sonorancy of the two consonants matches, and that there are the following asymmetries regarding targets and triggers:

(6) Target manner:

a. Nasal sonorants are more likely targets than nonnasal sonorants.

b. Nonstridents are more likely targets than strideents.

c. Fricatives are more likely targets than affricates.

(7) Target place:

a.Alveolars are more likely targets than palatoalveolars.

(8) Trigger manner:

Nonnasal sonorants are more likely triggers than nasal sonorants.

Strideents are more likely triggers than nonstridents.

c. Affricates are more likely triggers than fricatives.

(9) Trigger place:

Palatoalveolars are better triggers than alveolars.

(10) Position of target:

C_1 assimilate to C_2.

Regarding voicing and emphasis assimilation, the generalization is the same as other C_1C_2 combinations: they occur provided that both C_1 and C_2 are obstruents and that they share the same place of articulation, either underlyingly or due to place assimilation.

DISCUSSION

The focus on Jordanian dialects facilitated examination of detailed data presenting adequate illustration of cases of assimilation consistent either with the phonological theory or with the sociolinguistic account of variation in speech rate. On one hand, there are assimilation patterns consistent with the established implicational hierarchies in Jun (2005) and Monahan (1993). On the other hand, there are cases where assimilation patterns are not present in all dialects. First, if C_1 is a coronal nasal /n/, it harmonizes in place to a next labial or velar stop (oral or nasal in all dialects put aside AD in the case of nouns ending with /ɪn/ in BD). Second, Coronal plosives /t, d, tˤ, dˤ/ harmonize in place to a next labial plosive, but not to a velar plosive. However, this does not occur in both AD and BD. Third, within sonorants, nonnasals trigger in total assimilation of the nasal /n/, but not *vice versa* in AD and BD. In RNUD and GD, however, the process involves the contrary where nasals trigger assimilation in nonnasals.

Fourth, within nonsonorants, nonstridents harmonize with stridents, but not *vice versa*. Assimilation is total in that minor place assimilation is accompanied by both emphasis assimilation and voicing assimilation. The process is clear in RUND and GD. In AD allophonic changes block the process where /θ/ becomes /t/ or /s̪/ and / D/ changes into /d/.The process doesn't occur in BD. Fifth, within stridents; alveolars assimilate to palatoalveolars and *vice versa*. This occurs in RNUD and GD but not in AD nor in BD. And in AD, nonstrident obsturents are pronounced with a sibilant allophone. The implicational hierarchies on regressive place assimilation established by Mohanan's and Jun's typological works are regularly present almost across all dialects in Jordan. It has been noticed that assimilation in Jordanian dialects is often conditioned by the similarity between the two adjacent consonants. The phenomenon is that the more similar the two consonants are, the more likely that they will assimilate to become identical. In the present paper, the researchers have presented an inclusive representation of consonantal assimilation in four dialects of Jordanian Arabic. The implicational hierarchies regarding place assimilation established by Mohanan's and Jun's typological works generally make the correct predictions in Arabic dialects of Jordan. Moreover, several generalizations give the impression to conflict with the established implicational hierarchies. For instance, AD and BD employ more carful speech than the other two dialects (RUND and GD).

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