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Pharyngealization in Syrian Arabic

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Abstract

This research investigates the process of pharyngealization—also referred to as emphasis spread (ES)—in Syrian Arabic (SyA). It gives a detailed theoretical study of pharyngealization. The study provides an articulatory, acoustic, and phonological account of emphatic sounds and their contrast with plain counterparts. The study explores the domain and direction of ES, demonstrating that emphasis spreads bidirectionally within the phonological word and, in certain cases, across word boundaries. Using both autosegmental and optimality–theoretic frameworks, the chapter models how the [RTR] (retracted tongue root) feature spreads.

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The analysis contributes to a deeper understanding of pharyngealization as a harmony process and its interaction with phonetic and phonological constraints in |Syrian Arabic.

Key words:

Pharyngealization

Emphatic spread

Emphatic consonants

[RTR] feature (retracted tongue root)

المُلخَص

يتناول البحث دراسة تفصيلية حول عملية التفخيم الحنجري والمعروفة أيضا بانتشار التفخيم في اللغة العربية وعلى وجه الخصوص في اللهجة السورية. ويقدم البحث وصفا نطقيا وصوتيا وصرافيا للأصوات المفخمة ويقارنها بنظيراتها المرققة. ويستكشف البحث اتجاه انتشار التفخيم، مبينا ان التفخيم يمتد في الاتجاهين داخل الكلمة، وفي بعض الحالات، يتجاوز حدود الكلمة. وتستثمر هذه الدراسة اطاري التحليل المقطعي والذاتي والنظرية المثالية، فتقدم الدراسة نموذجا لانتشار سمة ارتداد جذر اللسان وكيفية تفاعلها مع المقاطع الشفافة والمعتمة. كما تبحث في تأثير الأصوات المفخمة على الحركات المجاورة، كاشفا عن فروق لهجوية في منع انتشار التفخيم، وخفض الحركات، وتحديد مجاله. وتسهم الدراسة في تعميق فهم عملية التفخيم

الآنآرى بوصفها نوعا من الانسآام الصوتى فى آوضفآ نفاعلها مع القفوء الصوتفة
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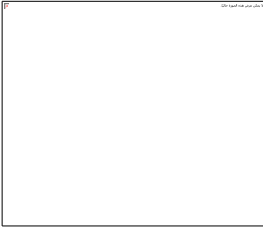
آلمات مفآاحفة:

الآفآفم الآنآرى

انآشار الآفآفم

الأصوات المفآمة

ارآءاء الآنر اللسانى



Introduction

This study examines the phenomenon of pharyngealization, or emphasis spread (ES), in Syrian Arabic (SyA). The discussion covers the articulatory and acoustic properties of emphatic sounds, the phonemic contrast between emphatic and plain segments, the scope of emphasis spread, and the features used to characterize it. Analytical frameworks are also applied, including an autosegmental account and an optimality-theoretic approach, in order to explain the variation observed across the dialect.

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Emphatic consonants in Arabic are characterized by a dual articulation. The primary articulator is coronal, involving contact between the tongue tip and the alveolar ridge. The secondary articulation involves retraction of the tongue root toward the pharyngeal wall. These gestures give emphatics their distinct acoustic profile, lowering the second formant (F2) and sometimes raising the first formant (F1). As a result, emphatic consonants are acoustically more compact compared to their plain counterparts.

In Syrian Arabic, ES typically spreads across the entire phonological word, not just the syllable. Furthermore, ES may extend across word boundaries. The directionality, however, differs: leftward spread is consistently unblocked, while rightward spread is subject to opacity effects in SyA. Opaque segments in SyA include /w/, /j/, and glides, which resist carrying the [RTR] feature further.

1–The Articulatory and Acoustic Nature of Emphatic Sounds in Arabic

Most Arabic dialects have a set of emphatic sounds, such as /ṭ, ḍ, ṣ, ẓ/. These sounds are produced using two places of articulations.

- a) Primary (front): The tip or blade of the tongue touches the alveolar ridge (coronal sounds)
- b) Secondary (back): A constriction occurs in the upper pharynx (pharyngeal).

Researchers like Gussenhoven & Jacobs (1998) note that the tongue root retracts toward the pharynx wall during emphatic production.

Other articulatory features can appear in some dialects but not all: Lip rounding and protrusion: observed in Palestinian Druze (Jakobson 1978) and San'ani Arabic (Watson 2002). Lateral spread of the tongue dorsum: helps create a more "hollow" shape (Zemánek 1996; Lehn 1963).

Increased oral and pharyngeal tension: makes emphatics stronger (fortis) than their plain counterparts. These secondary features vary by dialect, so the main focus is on the primary and secondary articulators.

2-ES Feature

Different features have been used to describe emphasis spreading or pharyngealization. Acoustic studies (Jakobson, 1978) describe emphatic segments with the feature [+flat]. Many linguists, however, focus on the articulatory characteristics. Chomsky and Halle (1968) use the feature complex [+low, +back], where [+low] indicates a depressed tongue body and [+back] indicates a retracted tongue body.

Other proposals include:

[+UPC] (upper pharynx constriction) — Jarrah (1993)

[+emphatic] ([+EM]) — Sakarana (1999)

[+phar] (pharyngeal) — Thompson (2006)

[+RTR] (retracted tongue root) — Davis (1993, 1995), adopted by Zawaydeh (1998), and Adra (1999).

In this study, the feature [+RTR] will be adopted to best capture the articulation of pharyngealized sounds. RTR (retracted tongue root) refers to the position of the tongue root during vowel articulation. When a vowel is RTR, the tongue root is pulled back toward the pharynx, which slightly narrows the pharyngeal cavity. Emphatic sounds often sound "darker" or

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more back. They can affect the quality of surrounding consonants, especially emphatic consonants in Semitic languages.

3–Acoustic Effects

Emphatic sounds affect adjacent vowels, changing their formant frequencies:

F1 (first formant): slightly raised.

F2 (second formant): significantly lowered due to the tongue backing.

Studies in Lebanese (Obrecht 1968), Jordanian (Sakarna 1999), and Palestinian Arabic (Herzalla 1990) confirm this. Vowels near emphatics have a more compact spectrum, meaning the formants are closer together compared to plain vowels.

4–Aim of the Study

Here are the main aims of this study:

- a. The study investigates the process of pharyngealization (emphasis spread) in Syrian Arabic, identifying the articulatory and acoustic properties of emphatic segments, and determining the phonological domain and directionality of emphasis spread.
- b. The research examines the role of opaque and transparent segments in blocking or allowing emphasis propagation.
- c. It develops a formal representation of ES within autosegmental and optimality–theoretic frameworks, investigating the effects of emphatic and guttural sounds on surrounding vowels, and establishing dialectal

distinctions in the realization and constraint ranking of emphasis phenomena.

literature Review

Pharyngealization—often referred to as emphasis—is one of the most salient and widely discussed phonetic and phonological features of Arabic. It represents a secondary articulation involving a constriction of the upper pharynx or retraction of the tongue root, typically accompanying certain coronal consonants. Across the Arabic-speaking world, pharyngealized sounds play a crucial role in distinguishing meaning, shaping dialectal variation, and influencing neighbouring vowels and consonants through coarticulatory processes. Over decades, linguists have examined pharyngealization from articulatory, acoustic, phonological, and sociolinguistic perspectives, revealing both the shared features and the rich diversity within Arabic dialects.

1. Historical and Descriptive Foundations

The study of pharyngealization in Arabic dates back to early Arabic grammarians, who recognized *ṣād*, *ḍād*, *ṭā'*, and *zā'* as “emphatic” sounds distinguished by their heavy or thick quality. In modern linguistics, these are often described as consonants produced with a secondary constriction in the pharyngeal or uvular region (McCarthy, 1994; Watson,

2002). Articulatory studies (e.g., Ladefoged & Maddieson, 1996; Al-Ani, 1970) have confirmed that pharyngealized consonants involve a retracted tongue root and a lowered larynx, which modifies the resonance of the entire vocal tract. This secondary gesture differentiates them from their plain coronal counterparts.

Acoustically, pharyngealization results in a lowering of the second formant (F2) and sometimes a slight raising of the first formant (F1), producing a perceptually “darker” timbre (Zawaydeh, 1997; Al-Masri & Jongman, 2004). This acoustic signature not only characterizes the emphatic consonants themselves but also extends to adjacent vowels, revealing the long-distance influence that has fascinated phoneticians and phonologists alike.

2. The Inventory of Emphatic Consonants

Standard Arabic includes four primary emphatic consonants: /ṣ/, /ḍ/, /ṭ/, and /ẓ/. Many Arabic dialects maintain these phonemes, though their realization and domain of emphasis spreading vary. Some dialects introduce additional emphatic consonants (e.g., /rˤ/ in some Levantine and Iraqi varieties), while others neutralize certain emphatics through sound change. Jordanian and Syrian Arabic, for instance, preserve all four canonical emphatics and exhibit robust patterns of emphasis spread, making them ideal for comparative analysis (Adra, 1999; Davis, 1995; Sakarna, 1999).

3. Pharyngealization as a Spreading Feature

One of the defining characteristics of pharyngealization in Arabic is its ability to spread beyond the emphatic consonant itself. This process, known as emphasis spread (ES), affects neighbouring vowels and consonants, producing a harmonic domain that can extend across the entire word. Watson (1999, 2002) describes this as a type of vowel harmony driven by the [Retracted Tongue Root] (RTR) feature, which links multiple segments through autosegmental association.

In most dialects, ES operates bidirectionally but with varying strength. The leftward (regressive) spread is often stronger and more consistent, while rightward (progressive) spread may be limited or blocked by certain high vowels or consonants. Syrian Arabic typically shows partial opacity in rightward spreading—high vowels like /i/ and /u/ may resist pharyngealization—whereas Jordanian Arabic tends to allow full rightward spread within a phonological word (Sakarna, 1999; Zawaydeh, 1997).

Importantly, the domain of spread is not merely phonetic but phonological: studies have demonstrated that ES is constrained by morphological boundaries and interacts with stress and syllable structure. These observations underscore that pharyngealization functions as a systematic feature within the grammar rather than a surface co-articulation.

4. Theoretical Analyses

Autosegmental Phonology: Autosegmental phonology provided a natural framework for modeling emphasis spread. In this view, the [RTR] or [pharyngeal] feature resides on a separate tier that can associate with multiple segments across a word. McCarthy (1994) proposed that this autosegmental linking captures the non-local nature of ES and its

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bidirectionality without altering the underlying segmental sequence. This approach also explains why emphasis may skip certain segments, such as opaque high vowels.

Optimality Theory (OT): Within Optimality Theory, researchers have used constraint interaction to model variation in the extent and direction of ES. Constraints like SPREAD [RTR], ALIGN-L/R [RTR], and IDENT-IO [RTR] govern whether the feature spreads, how far it extends, and whether input features are preserved.

Analysis and Discussion

This research presents a detailed analysis and discussion of the theoretical aspects of pharyngealization. The research supports the explanations with suitable examples of Syrian Arabic in an attempt to give better understanding of how pharyngealization works and what role it plays in speech sounds,

1-Phonemic Contrast Between Emphatic and Plain Sounds

Emphatic sounds are distinct phonemes, not just variants of plain sounds. This can change the meaning of words.

Examples from Syrian Arabic:

[fæter] = “it became cool (water)” → [fæ̣tæ̣r] = “he had breakfast”

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Input	Output	Glossary
/masket # tÂair/ a bird”	[masketÂ tÂe:ÂrÂ]	“she caught
/mi:t # tÂo:n/ her photo”	[mi:tÂ tÂo:ÂnÂ]	“100 tons”
/ba:s # sÂu:rta/ her photo”	[ba:sÂ sÂu:ÂrÂtÂaÂ]	“he kissed

There are two points to highlight: the direction of ES and the two neighbouring segments being identical. It has been argued that emphasis spreads regressively to affect the preceding identical segment. In other words, sequences like s sÂ, z zÂ, t tÂ, and d dÂ are expected for this type of ES. However, the following examples raise some doubts about this claim:

SyrA

Input	Output	Glossary
/mi:t # dÂe:sa/ villages”	[mi:dÂ dÂe:ÂsÂaÂ]	“100
/ra:mez # tÂ / “Ramez! Show up!”	[ra:mesÂ tÂ ÂiÂiÂ]	

a process of regressive assimilation occurs in terms of pharyngealization and voice.

5–Autosegmental Account of Emphasis Spread (ES)

The feature of emphatic spread can move across other sounds in a word without being tied to only one consonant. This helps explain how the “emphasis” effect spreads in many Arabic words and phrases.

The solution for explaining how this spread works comes from McCarthy’s (1986) idea called “Tier Conflation.” This idea merges the separate consonant and vowel tiers into one single tier. When this happens, the [+RTR] feature can spread more easily to both consonants and vowels, since there are no barriers between them. As Sakarna (1999:168) explains, “emphasis spreads over neighboring segments after the consonant and vowel tiers have been merged onto a single tier.” This means that the pharyngealized feature can extend smoothly across a word, affecting all the sounds around it.

In simple terms, tier conflation provides a clear way to understand how the emphasis feature moves through a word in Arabic, combining sound structure and articulation into one connected system.

6–Optimality Theoretic Account of Emphasis Spread (ES)

In some Arabic dialects, certain consonants are emphatic or pharyngealized. This means they are pronounced with the tongue root pulled back, a feature known as [+RTR] (Retracted Tongue Root). Emphasis Spread (ES) happens when this emphatic feature spreads from the emphatic consonant to neighboring sounds (both vowels and consonants) in the same word. As a result, nearby sounds also become pharyngealized.

The Feature [RTR]

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[+RTR] → The sound is emphatic or pharyngealized. For example, the word: /ʃabr/–“patience”.

[-RTR] → The sound is non-emphatic. For example, the word/ samak/|” fish”.

When emphasis spreads, [+RTR] is shared across multiple sounds.

The research gives an enough explanation of optimality theory OT. The optimality theory is a framework in linguistics especially in phonology, syntax, and sometimes morphology. It was first developed by linguists such as Prince and Smolensky(1993).

Optimality Theory explains how languages choose the most optimal surface form (pronunciation) of a word by ranking constraints. There are two main types of constraints:

1. Markedness constraints – prefer certain structures or patterns (what the language “wants”).
2. Faithfulness constraints – prevent changes between the input (underlying form) and the output (surface form).
3. The Constraints for ES:

a. SPREAD [RTR]

Assign the feature [+RTR] to all segments in the emphatic domain.

This constraint favors spreading the emphatic feature to all neighboring sounds. It is violated when any sound in the emphatic domain surfaces without being pharyngealized.

b. IDENT-IO [RTR]

The output segment and its input correspondent must have the same [RTR] value.

This constraint ensures faithfulness to the input. It is violated when:

*An underlying [+RTR] sound surfaces as [-RTR].

*An underlying [-RTR] sound surfaces as [+RTR].

7.How Ranking Explains Emphasis Spread

When SPREAD [RTR] is ranked above IDENT-IO [RTR], the language allows the emphatic feature to spread. It is more important for all sounds in the domain to share [+RTR] than to stay faithful to the input.

When IDENT-IO [RTR] is ranked higher, spreading is blocked. Each sound keeps its original [RTR] value.

In short:

SPREAD [RTR] » IDENT-IO [RTR] → Emphasis Spread occurs.

IDENT-IO [RTR] » SPREAD [RTR] → No Emphasis Spread.

Emphasis spreads backwards: Monosyllabic words

SyA

Input	Output	Glossary
a) - /be:d/	→ [bê:d]	“egg”

- Emphasis spreads backwards: Disyllabic words

SyA

Input	Output	Glossary
a) - /tla:‘ ez/	→ [tâlâ:â?êz]	“she notices”
b) - /tra:qes/	→ [târâ:â?ês]	“you dance with”

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The examples show the emphasis spreading backwards in monosyllabic and disyllabic words.

– Emphasis spreads forwards: Monosyllabic words

SyA

Input	→	Output	Glossary
a) – /sʔo:t/		[sʔo:tʔ]	“sound”
b) – /dʔi:q/		[dʔi:qʔ]	“narrowness”

– Emphasis spreads forwards: Disyllabic words

SyA

Input	→	Output	Glossary
a) – /tʔfle/		[tʔfʔleʔ]	“baby (fem.)”
b) – /dʔlʔu/		[dʔlʔuʔ]	“his rib”

The examples show the emphasis spreading forwards in monosyllabic and disyllabic words.

Explaining the Role of Alignment Constraints in Emphasis Spread (ES).

In earlier analyses, the constraints SPREAD [RTR] and IDENT-IO [RTR] were enough to account for emphasis spread (ES) in some examples. These constraints handle how the pharyngealized ([RTR]) feature spreads across a word. However, in some cases, the direction of spreading—whether it goes leftward or rightward—differs. To handle this, we need to introduce alignment constraints that determine how far and in which direction [RTR] spreads.

Alignment Constraints

1. RTR-LEFT

ALIGN ([RTR], left, word, left)

→ The [RTR] feature must be aligned with the left edge of the word.

2. RTR–RIGHT

ALIGN ([RTR], right, word, right)

→ The [RTR] feature must be aligned with the right edge of the word.

(McCarthy 1997: 235) states that these constraints ensure that emphasis spreading (ES) stops at the boundaries of the word and indicate the direction of spreading.

Constraint Ranking

Alignment constraints (RTR–LEFT, RTR–RIGHT) are ranked above faithfulness constraints such as IDENT–IO [RTR]. They do not conflict with SPREAD [RTR], so they can be freely ranked relative to it.

Example 1: Leftward ES in Syrian Arabic (SyrA)

Input: /be:d^ʕ/ → [b^ʕe:ʕd^ʕ] “eggs”

Constraint ranking: RTR–LEFT, SPREAD [RTR] >> IDENT–IO [RTR]

The following tableau illustrates:

/be:d ^ʕ /	RTR–LEFT	SPREAD [RTR]	IDENT–IO [RTR]
a)– (b ^ʕ e:ʕd ^ʕ)			**
b)– (b ^ʕ e:d ^ʕ)		!*	*
c)– b(e:ʕd ^ʕ)	!*		*

Candidate (a) is optimal because it only violates the lower–ranked IDENT–IO [RTR]. Candidate (b) fails SPREAD [RTR] since the vowel [e:] is not pharyngealized. Candidate (c) fails RTR–LEFT, as the emphasis does not extend to the beginning of the word.

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So, SPREAD [RTR] controls the extension of the pharyngealized feature. RTR–LEFT and RTR–RIGHT determine the direction of emphasis spread. Alignment constraints are ranked above faithfulness constraints and ensure that ES reaches the proper word boundary.

In summary, the analysis and discussion presented in this study have shown that pharyngealization in Syrian Arabic operates as a systematic and bidirectional process, influenced by both articulatory and phonological factors. The interaction between emphatic and non-emphatic segments reveals a complex harmony system governed by constraint ranking and segmental opacity. These findings pave the way for a broader understanding of the theoretical and empirical dimensions of emphasis spread in Arabic dialects.

To conclude, this research has provided a deep study of the phenomenon of pharyngealization, or emphasis spread (ES), in Syrian Arabic (SyA), integrating articulatory, acoustic, and phonological perspectives. Through the combination of descriptive data and theoretical modeling, the study has shown that pharyngealization in SyA is not a random or purely phonetic occurrence, but a highly systematic process governed by universal and language-specific constraints. The findings reveal that ES in Syrian Arabic is bidirectional in nature, extending both leftward and rightward within the phonological word, yet exhibiting asymmetry due to the presence of opaque and transparent segments. Opaque sounds such as high vowels and glides act as barriers that restrict

the spread of the [RTR] (Retracted Tongue Root) feature, while other segments permit its propagation. This interaction reflects a dynamic balance between articulatory ease and phonological structure, illustrating how local gestures give rise to global harmony effects in the language.

By applying the frameworks of Autosegmental Phonology and Optimality Theory (OT), the study has offered an explanatory account of how the [RTR] feature spreads, aligns, and interacts with competing constraints. Autosegmental representation captures the multi-tiered association of features, while OT formalizes the ranking of constraints such as SPREAD [RTR], ALIGN-L/R [RTR], and IDENT-IO [RTR]. The resulting analysis successfully models both the directionality and the domain of ES, as well as the dialectal differences between Syrian and other Arabic varieties.

In conclusion, this study contributes to the theoretical and descriptive understanding of Arabic phonology by demonstrating that pharyngealization in Syrian Arabic operates as a structured, rule-governed process rather than a surface phonetic phenomenon. It highlights the importance of integrating multiple analytical frameworks to explain complex patterns of feature interaction. Future research may expand on this work by exploring the sociophonetic and diachronic dimensions of emphasis spread, comparing its realization across other Arabic dialects, and investigating its perceptual implications for native and non-native speakers.

References

- AL-MASRI, M. & JONGMAN, A. 2004. _Acoustic Correlates of Pharyngealization in Jordanian Arabic. _ *Phonetica*, Vol. 61(4), pp. 210–229.
- CHOMSKY, N. & HALLE, M. 1968. _The Sound Pattern of English. _ Harper & Row.
- DAVIS, S. 1993. _Arabic Pharyngealization and Phonological Features. _ In M. Eid & C. Holes (Eds.), _Perspectives on Arabic Linguistics V (Current Issues in Linguistic Theory, Vol. 101, pp. 149–162). _ John Benjamins.
- DAVIS, S. 1995. _Emphasis Spread in Arabic and Grounded Phonology. _ *Linguistic Inquiry*, Vol. 26(3), pp. 465–498.
- GOLDSMITH, J. A. 1976. _Autosegmental Phonology. _ Doctoral Dissertation, Massachusetts Institute of Technology.
- HANSSON, G. 2001. _Consonant Harmony and Long-distance Phonology: A Typology and Theory. _
- HERZALLAH, R. S. 1990. _Aspects of Palestinian Arabic Phonology: A Non-linear Approach. _ Doctoral Dissertation, Cornell University.
- JAKOBSON, R. 1978. _“Mufaxxama: The ‘Emphatic’ Phonemes in Arabic.”_ In S. H. al-Ani (Ed.), _Readings in Arabic Linguistics_ (pp. 269–283).
- LADEFOGED, P. & MADDIESON, I. 1996. _The Sounds of the World’s Languages. _

- LEHN, W. 1963. _Emphasis in Cairo Arabic. _ Language, Vol. 39(1), pp. 29–39.
- MCCARTHY, J. J. 1986. _OCP Effects: Gemination and Antigemination._ Linguistic Inquiry, Vol. 17(2), pp. 207–263.
- MCCARTHY, J. J. 1994. _The Phonetics and Phonology of Semitic Pharyngeals._ In P. Keating (Ed.), _Phonological Structure and Phonetic Form: Papers in Laboratory Phonology III._ Cambridge University Press.
- SAKARNA, A. 1999. _Emphasis Spread in Jordanian Arabic: An Optimality–theoretic Account. _
- SAKARNA, A. K. 1999. _Phonological Aspects of ṣAbady Arabic: A Bedouin Jordanian Dialect. _ Doctoral Dissertation, University of Wisconsin–Madison.
- WATSON, J. 1999. _The Directionality of Emphasis Spread in Arabic. _ Linguistic Inquiry.
- WATSON, J. C. E. 2002. _The Phonology and Morphology of Arabic._ Oxford University Press.
- ZAWAYDEH, B. 1997. _Gradient Uvularization Spread in Ammani–Jordanian Arabic. _ University of Illinois.
- ZAWAYDEH, B. 1998. _Gradient Uvularisation Spread in Arabic. _
- AL–ANI, S. 1970. _Arabic Phonology. _ Mouton.

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