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An Optimality-Theoretic Analysis of Final Long Vowel /a:/ Deletion in the Third-Person Feminine Suffix in Qassimi Arabic

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***Abstract*—This study examines the deletion of the third-person feminine long vowel /a:/ in Qassimi Arabic (QA), a Najdi dialect spoken in Saudi Arabia's Qassim region. The research employs Optimality Theory (OT) to analyze this phonological process, which has been overlooked despite its significance in Arabic dialectology. By investigating data from native QA speakers, the study identifies and evaluates the markedness and faithfulness constraints that govern /a:/ deletion in various grammatical contexts. The findings reveal that vowel deletion in QA is systematically controlled by a ranked interaction of constraints, with FINAL-C and other markedness constraints playing crucial roles. The study also explores exceptions and sociolinguistic factors affecting the deletion process. This research contributes to understanding the complex interplay between phonology and morphology in Arabic dialects, highlighting the effectiveness of constraint-based approaches in analyzing dialectal variations. It not only enhances our knowledge of Arabic linguistic diversity but also paves the way for further investigations into vowel behavior across Arabic dialects within the OT framework.**

***Index Terms*—vowel deletion, apocope, methodology, third-person feminine pronoun, Optimality Theory, Qassimi Arabic**

I. Introduction

Apocope is a phonological process in which a sound is omitted from the end of a word. This phenomenon occurs in various languages and is often motivated by the principles of linguistic economy and prosodic alignment. Phonological researchers have paid significant attention to apocopes, particularly in languages that exhibit systematic word-final deletions to conform to specific syllabic or morphological patterns. According to Crowley and Bowern (2010), apocopes help reduce syllabic complexity, thereby enhancing speech fluency by minimizing articulatory effort.

Apocopes are observed in different forms across Arabic dialects. For instance, short vowel deletion is well documented in Yemeni Arabic (YA) dialects, where it typically occurs with past tense verbs, as demonstrated in (1a) and (1b) (Yaari et al., 2012; Suparno et al., 2022). In Cairene Arabic (CA), McCarthy (2005) provides a hypothetical example that illustrates the deletion of word-final short vowels, which is motivated by phonological constraints, as seen in (1c).

(1) Final short vowel apocope:
a. /lʕiba/ 'to play' becomes [lʕib] (Yaari et al., 2012, p. 446)
b. /sʔala/ 'to flow' becomes [sʔal] (Suparno et al., 2022, p. 127)
c. /takaba/ becomes [takab] (McCarthy, 2005, p. 13)

Further investigations by Altakhaineh and Alshamari (2016) delve into the deletion of word-final semi-vowels in Modern Standard Arabic (MSA), resulting in a compensatory lengthening of the preceding vowel, as illustrated in (2a).

(2) Final semi-vowel apocope:
a. /daʕaw/ 'prayed' becomes [daʕa:] (Altakhaineh & Alshamari, 2016, p. 3)

Moreover, apocope is not confined to vowel deletion. AlAmro (2016) discusses the deletion of word-final glottal stops in Najdi Arabic (NA), as evidenced in (3a).

(3) Final glottal stop apocope:
a. /ʔal.kim.ya:ʔ/ 'chemistry' becomes [ʔal.ki:.mya] (AlAmro, 2016, p. 386)

The variety of apocope processes across different Arabic dialects highlights the complex interplay of phonological, morphological, and syntactic factors that shape the sound systems of these languages. Apocopes influence Arabic dialectal diversity, particularly in how regional variations affect the treatment of word-final vowels and consonants. This is evident in the handling of the third-person feminine suffix -ha:, which is attached to nouns, adjectives, and interjections in possessive contexts, as well as verbs, adverbs, prepositions, and conjunctions for object usage. In Standard Arabic (SA), this suffix generally retains its full form, as shown in (4a).

(4) Third-person feminine suffixation in SA
a. /bajt/ 'house' + /ha:/ 'her' → /baj.tu.ha:/ 'her house'

However, in colloquial Arabic dialects, the suffix undergoes various phonological adaptations that align with dialect-specific constraints and syllable preferences (Ingham, 1994; McCarthy, 2005). For example, in Egyptian Arabic (EA) and Iraqi Arabic (IA), vowel epenthesis is frequently used, whereby an additional vowel is inserted into the stem upon attaching the third-person feminine suffix, as shown in (5a) and (5b). In Omani Arabic (OA), the inflected form of the third person singular of the active participle is formed by infixing the morpheme /in/ between the active participle stem and the pronominal suffix, as exemplified in (5c).

(5) Third-person feminine suffixation with vowel & consonant epenthesis
a. In EA, /bint-ha/→[bintaha] 'her daughter' (Zawaydeh, 1997; as cited in Alnuqaydan, 2021)
b. In IA, /bint-ha/→[binitha] 'her daughter' (Zawaydeh, 1997; as cited in Alnuqaydan, 2021)
c. In OA, /nasja:n-ha/→[nasja:ni:nha] 'he forgot her' (Shāban, 1977; as cited in Farwaneh, 2009)

By contrast, Lebanese Arabic (LA) and Syrian Arabic (SyA) demonstrate consonant apocope, which results in the deletion of the final consonant of the stem, as illustrated in (6a). In the Abu Dhabi dialect, the consonant portion of the feminine suffix is deleted, resulting in the gemination of the preceding consonant (the coda of the stem), as exemplified in (6b).

(6) Third-person feminine suffixation with consonant apocope
a. In LA and SyA, /be:t-ha/ → [be:ta] 'her house'
b. In Abu Dhabi dialect, /ʔuxt-ha/ → [ʔuxutta] 'her sister' (Qafisheh, 1977; as cited in Farwaneh, 2009)

The present study focuses on Qassimi Arabic (QA), a subdialect of NA spoken in the Qassim region of Saudi Arabia. This dialect exhibits a particularly distinctive adaptation of third-person feminine suffixation. In QA, the final long vowel /a:/ in -ha: is deleted, reducing the suffix to -h. This phonological transformation is exemplified in (7a).

(7) Third-person feminine suffixation with vowel apocope
a. In QA, /baj.tu.h**a:**/ → [be:.tah] "her house"

The Qassimi dialect is primarily spoken by the sedentary (Hadari) population in the Qassim region, setting it apart from the dialects of local Bedouin tribes like Anizah, Utaibah, Subai', Dawasir, Harb, and Mutair, which still reflect their tribal characteristics despite more settled lifestyles (Ingham, 1994). This study surveyed 203 participants from diverse Qassim towns, representing various ages, genders, and educational backgrounds. Following confirmation of the distinctive Hadari dialect, the study seeks to address a gap in the literature by providing a systematic analysis of the final long vowel /a:/ deletion phenomenon in the -ha: suffix in QA. This study aims to comprehensively analyze the deletion of the final vowel /a:/ in QA by investigating the phonological and morphological factors that may trigger or inhibit this process. Utilizing the OT framework, this study identifies the constraints and rankings that influence final vowel deletion in QA.

A. Study Significance

This study on apocope in Qassimi Arabic (QA) provides valuable insights into the unique phonological features that develop within individual dialects, particularly regarding feminine suffixation. By emphasizing the distinct characteristics of QA, the research enhances our understanding of Arabic dialectology and highlights the complexity within the Arabic language family. The findings aim to illuminate the interplay between phonology and morphology in QA, contributing to broader discussions on vowel behavior across Arabic dialects and enriching our appreciation of linguistic diversity.

B. Statement of the Problem

The deletion of the final long vowel /a:/ in the third-person singular feminine suffix in QA is a unique phonological process that has not been thoroughly examined. While vowel deletion, shortening, and reduction are well documented in various Arabic dialects, the specific mechanisms and conditions surrounding apocope in QA are still not well understood. This deletion occurs in morpho-phonological contexts, especially when the feminine suffix is added to any part of speech. However, there is a significant research gap regarding this phenomenon's systematic nature, particularly when applying theoretical frameworks, such as OT. Thus, this study tries to answer the following questions: (1) What are the phonological and morphophonological factors that contribute to the deletion of the final long vowel /a:/ in the third-person singular feminine suffix in Qassimi Arabic? (2) How can the interaction of these phonological and morphophonological factors be accounted for within the framework of Optimality Theory?

II. Phonology of QA

This section presents the most recent vowel inventory of QA, along with syllable structure based on research conducted by native speakers of the Qassimi dialect.

A. Vowel Inventory

In the context of the QA vowel system, Al Motairi (2015) identified a comprehensive set of ten vowel sounds in QA, encompassing three short vowels /i/, /u/, /a/, five long vowels /i:/, /u:/, /e:/, /o:/, /a:/, and two diphthongs /aɪ/, /aʊ/. Alrashed

(2018) then further expanded this inventory by introducing the low back vowel /ɑ/ as a contrastive phoneme, distinguishable in minimal pairs such as /daff/ 'warm-up IMP' and /dɑff/ 'push PFV'.

Additionally, Al-Numair's (2021) analysis contributed to the expansion of the QA vowel repertoire by identifying a new vowel phoneme, /ɘ/, which occurs exclusively in word-medial positions, as exemplified in /ʃiggɘh/ ('apartment'). This latest addition brings the total number of vowel sounds in QA to twelve, as illustrated in Figure 1.

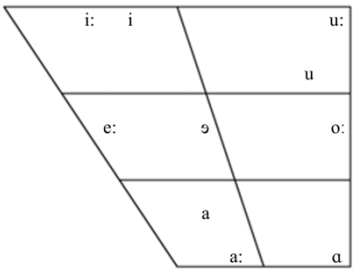

Figure 1. Vowels in Qassimi Arabic

Furthermore, Alhoody (2019) points out that there is no length contrast in the mid-vowels /eː/ and /oː/; these vowels are only long due to their historical evolution from Classical Arabic diphthongs. Specifically, "in Classical Arabic, the diphthongs /aɪ/ and /aʊ/ transform into the long vowels /eː/ and /oː/ in the QA dialect" (p. 5).

B. Syllable Structure

The syllable structure of Qassimi Arabic (QA) demonstrates a diverse range of patterns that can be classified into three primary categories based on syllable weight: light, heavy, and superheavy (Alhoody & Aljutaily, 2020). Al Motairi (2015) identified five fundamental syllable types in QA: CV, CVC, CVV, CVVC, and CVCC. Expanding on this, Alhoody and Aljutaily (2020) proposed the addition of two superheavy syllables: CCVVC and CVVCC.

Alrashed (2018) further expanded the repertoire to the syllable structure patterns by including CCV, VVC, and VC, making the number of syllable patterns to be ten as shown in Table 1. This expansion challenges the notion that QA syllables invariably begin with a consonant.

TABLE 1
SYLLABLE STRUCTURE PATTERNS IN QASSIMI ARABIC

Type	Pattern	Example	Gloss	Source
Light	CV	/hu/	'he'	Alhoody and Aljutaily (2020)
	VC	/**al**.beːt/	'the house'	Alrashed (2018)
Heavy	CVV	/lii/	'it is mine'	Alhoody and Aljutaily (2020)
	CCV	/tsla/	'kidneys'	Alrashed (2018)
	CVC	/bis/	'cat'	Alrashed (2018)
	VCC	/irts/	'support IMP'	Alrashed (2018)
Super Heavy	CVVC	/naar/	'fire'	Al Motairi (2015)
	CVCC	/bint/	'girl; daughter'	Al Motairi (2015)
	CCVVC	/traab/	'sand'	Alhoody and Aljutaily (2020)
	CVVCC	/daalb/	'guidebook'	Alhoody and Aljutaily (2020)

III. THEORETICAL BACKGROUND

Optimality theory (OT) marks a paradigm shift in phonology from a traditional rule-based framework to a constraint-driven model. Introduced by Prince and Smolensky in 1993 and revised in 2004, OT provides a dynamic perspective on linguistic form generation. The theory encompasses three crucial components: generator (Gen), which produces a range of potential candidates for any given input; constraints (Con), which evaluate these candidates based on universal but violable principles ranked according to language-specific preferences; and Evaluator (Eval), which selects the optimal candidate from the generated set.

Constraints are categorized into two main types: markedness constraints, which favor simpler, unmarked structures in the output, and faithfulness constraints, which strive to maintain the integrity of the input by minimizing changes in the output. Eval determines the optimal candidate by identifying the one that best satisfies the ranked constraints that align with the language's specific constraint hierarchy. In OT tableaux, violations are represented by asterisks (*), with strong violations that disqualify a candidate marked by an asterisk followed by an exclamation point (*!). The optimal candidate is indicated by a pointing hand symbol (☞).

IV. LITERATURE REVIEW

This section consists of two subsections. The first discusses important literature on a specific type of vowel deletion known as apocope, which involves the removal of unstressed vowels from the end of words. The second subsection

addresses the limited linguistic contexts that have explored this phenomenon, along with other types of vowel deletion, using OT to examine how conflicting phonological constraints influence language outputs.

A. Final Vowel Deletion (Apocope)

One of the oldest studies covering apocopes is Taylor's (1994) study, which defines apocope as the elision of an unaccented final vowel. This study examined how vowel deletion interacts with syllable constraints, specifically the phonotactic rules that regulate how sounds are properly arranged in a language. It emphasized that apocope in Portuguese, Romanian, and French most likely occurs after sonorants. Taylor emphasized that vowel deletion is caused by certain constraints, such as positional constraints (segment deletion).

In their 2012 study, Yaari et al. examined vowel deletion in Yemeni Arabic dialects and found that dialects that favor closed syllables tend to delete final vowels more frequently. The study highlights the deletion of short vowels, especially in past tense verbs with third-person pronouns; for example, /lʕiba/ 'to play' becomes [lʕib]. This deletion affects verbs, pronouns, and infinitives, showing significant regional variation. This study offers deeper insight into the unique phonological features of Yemeni dialects.

Altakhaineh and Alshamari (2016) examine the deletion of semi-vowels in MSA from a phonological perspective. The authors argue that semi-vowels (/w/ and /y/) are deleted in word-final positions. This deletion prompts compensatory lengthening of the preceding vowel to maintain a syllable structure, as seen in verbs such as /daʕaw/ 'prayed', which becomes [daʕa:]. Conversely, vowel shortening occurs when lengthening does not take place, such as in /dʕu/ 'call', in which the long vowel /u:/ is shortened to [ʊ]. The study highlights that these processes are crucial for preserving the prosodic and phonotactic balance of Arabic syllable structure.

Suparno et al. (2022) explore various phonological differences between MSA and two Yemeni Arabic dialects: Dhamar and Sana'a. This study emphasizes apocope as a significant sound change, defined as the omission of one or more phonemes at the end of a word. Social, geographical, and cultural factors influence this phenomenon. For example, the MSA past tense verb /sʔala/ 'to flow' in SA is shortened to [sʔal] in both Yemeni dialects, omitting the final /a/. These changes reflect the adaptation of language to different environments and social contexts, highlighting the dynamic nature of Arabic dialects.

B. Optimality Theory (OT)

One of the most significant developments in generative grammar is OT, which was proposed by Prince and Smolensky. This theory is highly relevant not only to phonology but also to other areas of linguistics. Constraints are the key feature that sets OT apart as a constraint-based approach to phonology.

McCarthy (2005) discusses the phenomenon of vowel deletion in CA, specifically focusing on the deletion of word-final short vowels. For example, the underlying form /takaba/ becomes takab. This process is driven by the markedness constraint FINAL-C, which prohibits word-final vowels and ensures that every phonological word ends in a consonant. In addition, the constraint MAX(V+) protects long vowels from deletion, ensuring that they only shorten but are not deleted. The interplay of these constraints explains why word-final short vowels are deleted while long vowels are merely shortened.

Al Motairi (2015) examines the phenomenon of high vowel deletion (HVD) in QA, in which short high vowels are deleted in non-final open syllables, significantly affecting the syllable structure. This process creates complex onset clusters and non-final superheavy syllables (CVVC and CVCC). HVD is active in QA, applied whenever a short high vowel occurs in a non-final open syllable, except when surface high vowels result from raising an underlying /a/. This analysis highlights the interaction between high vowel deletion and low vowel raising, emphasizing the importance of constraint ranking in OT to account for these phonological processes.

Using OT, AlAmro (2016) conducted the first study that implemented OT to account for NA syllabification and highlighted how phonological constraints influence the syllable form. He emphasizes apocope as an essential process, particularly the omission of the final glottal stop in NA using the markedness constraint (*ʔ] - Glottal stop must be deleted word-finally). MSA words, such as /ʔal.ki.ya:ʔ/ 'chemistry', lose their final glottal stop in NA, becoming [ʔal.ki:.mya]. According to AlAmro, the removal of the glottal stop to create an optimal syllable structure is encouraged by OT constraints.

Alhoody and Aljutaily (2020) discuss vowel deletion (syncope) in QA, in which unstressed high short vowels (ɪ and u) are deleted from non-final syllables, often following stressed syllables such as CVVC. This process results in initial bi-consonantal clusters. An example is /fɪ.raaʃ/ becoming [fraaʃ] 'bed'. The analysis uses OT and focuses on constraints such as ONSET (requiring syllables to have onsets) and *i] σ (banning high short unstressed vowels in open syllables), with the optimal candidate satisfying the high-ranking constraints while minimally violating the lower-ranking constraints.

Alammar (2022) investigates high vowel syncope in Zilfaawi Arabic, which is part of NA, through a constraint-based lens of OT, identifying it as a non-metrical phonological process that primarily involves the deletion of high vowels /i/ and /u/ in non-final open syllables. This syncope is driven by the markedness constraint REDUCE, which aims to minimize vowel duration rather than enhance prosodic structure and indicates a focus on phonological economy. The analysis reveals that the faithfulness constraint MAX-high, which seeks to preserve high vowels, is ranked lower than REDUCE, leading to instances in which high vowels are omitted to comply with this constraint, as seen in the

transformation of /kataba/ ‘he wrote’ to [ktaba]. This highlights the distinct interaction between markedness and faithfulness constraints within the language’s phonological system.

Using harmonic serialism (HS), a derivational framework of OT, Al Solami (2024) examines vowel deletion and epenthesis in the Alwuʕara Dialect of Bedouin Hijazi Arabic. The study highlights how the sonority levels of consonants in the onset and preceding coda positions trigger vowel deletion. This process can create word-medial clusters that require vowel epenthesis. For example, the word /madrasah/ ‘school’ undergoes medial vowel deletion in the second syllable due to the sonority hierarchy, resulting in /madr.sah/. To resolve the sonority violation, a vowel is inserted, leading to [ma.dir.sah]. This study offers new insight into the phonological rules governing vowel behavior in this under-studied dialect.

V. An Optimality Theoretical Analysis of Apocope in QA

In SA, possessive pronouns are suffixes attached to nouns, adjectives, and interjections, while object pronouns are linked to verbs, adverbs, prepositions, and conjunctions. In QA, the deletion of the final long vowel /a:/ occurs in both feminine possessive and object pronoun suffixes, regardless of the part of speech they modify.

Table 2
Single Third-Person Feminine Suffixation in SA & QA

Part of speech	Word final	Stem	+ short V	Suffix	Standard Arabic (UR)	Qassimi Arabic (SR)
Noun	Consonant	bajt	+ /u/	/ha:/	/baj.tu.ha:/	[be:.tah]
	Glottal stop	ma:ʔ	+ /u/	/ha:/	/ma:.ʔu.ha:/	[ma:h]
Verb	Short low V	sa:.ma.ħa	-	/ha:/	/sa.ma.ħa.ha:/	[sa:.ma.ħah]
	Long low V	sam.ma:	-	/ha:/	/Sam.ma:.ha:/	[sam.ma:h]
Adjective	Glottal stop	ða.ˈka:ʔ	+ /u/	/ha:/	/ða.ˈka:.ʔu.ha:/	[ðe.ˈka:h]
	Consonant	dʒɑ.ˈmɑ:l	+ /u/	/ha:/	dʒɑ.ˈmɑ:.lu.ha:/	[dʒi.mɑ:.lah]
Adverb	Consonant	taħt	+ /a/	/ha:/	/taħ.ta.ha:/	[taħ.tah]
	Glottal stop	wa.ra:ʔ	+ /a/	/ha:/	/wa.ra:.ʔa.ha:/	[wa.ra:h]
Preposition	Consonant	Min	-	/ha:/	/mɪn.ha:/	[im.nah]
	Long low V	ʕa.la:	+ /j/	/ha:/	/ʕa.laj.ha:/	[ʕal.jah]
Conjunctions	Short low V	la:.kin.na	-	/ha:/	/la:.kɪn.nɑ.ha:/	[la:.kin.nah]
	Short low V	li.ʔan.na	-	/ha:/	/li.ʔan.na.ha:/	[lan.nah]
Interjections	Long low V	ma: ʔaħ.lɑ:	-	/ha:/	/ma: ʔaħ.lɑ:.ha:/	[jɑ ħɪl.wah]

A. Data

The researcher gathered data from several cousins who were native speakers of QA. Particular attention was given to including words from various parts of speech, diverse syllable structures, and a range of word-final sounds, including consonantal and vocalic endings.

(8) Single third-person feminine suffixation form in QA

a. /be:.tah/ ‘her house’
b. /ma:h/ ‘her water’
c. /sa:.ma.ħah/ ‘he forgave her’
d. /sam.ma:h/ ‘he named her’
e. /ðe.ˈka:h/ ‘her intelligence’
f. /dʒi.mɑ:.lah/ ‘her beauty’
g. /taħ.tah/ ‘below her’
h. /wa.ra:h/ ‘behind her’
i. /im.nah/ ‘from her’
j. /ʕal.jah/ ‘on her’
k. /la:.kin.nah/ ‘but she…’
l. /lan.nah/ ‘because she…’
m. /jɑ ħɪl.wah/ ‘How beautiful she is!’

B. Analysis

To analyze apocopes in QA using OT and to provide a clearer understanding of this phenomenon, the following markedness and faithfulness constraints are utilized:

(9) Markedness constraints

a. FINAL-C: Word-final vowels are prohibited. (McCarthy, 2005, p. 12)
This constraint is exclusively applied to the feminine pronoun suffix -ha: in QA.
b. aC] σ: A low open unrounded vowel must precede the last syllable-final consonant in feminine pronoun suffixes. (Adapted and modified from Rakhieh, 2009)
c. Syllable Economy (SE): One violation is assigned to every syllable found in an utterance. (Hawkins, 2022, p. 216)
d. *ʔ-SEMI: No semi-syllable with a glottal stop as an onset. (Alammar, 2022, p. 280)

(10) Faithfulness constraints

a. MAX-C-IO: There is no deletion of consonants. (AlAmro, 2015, p. 384)
b. DEP-IO:** Output segments must have input correspondents. (Kager, 1999, p. 93)

As previously stated, apocope in QA involves the deletion of the final long vowel /a:/ across various parts of speech, particularly those affecting forms that attach to the suffix /ha:/, which is reduced to /h/. As shown in Table 2, this consonant is always preceded by a low open vowel with variations in quality and length. The third-person feminine pronoun suffix /h/ shows two main patterns: it can be preceded by either a short low open vowel /a/ or a long low open vowel /a:/. The

choice between these forms depends on the phonological structure of the stem to which the suffix is attached. The following subsections explore these patterns and any exceptions in detail, supported by tables and examples for clarity.

(a). Suffix /h/ Preceded by /a/

In cases in which the suffix /h/ is preceded by /a/, as shown in examples (8a), (8c), (8f), (8g), (8i), (8k), and (8l), several high-ranking constraints come into play. Notably, the FINAL-C constraint, which prohibits vowel-final words for feminine pronoun suffixes, is crucial in eliminating candidates that end with a vowel. In addition, the aC] σ constraint ensures that a low open unrounded vowel precedes the final consonant. Tableau 1. demonstrates how the optimal candidate effectively balances the markedness and faithfulness constraints, preserving input consonants while minimizing extraneous syllables.

Tableau 1. /bajt/ [be:.tah] "her house"

Input /bajt/	FINAL-C	aC] σ	SE	DEP-IO
a. /baj.tu.ha:/	*!	*	***	
b. /bej.ta/	*!	*	**	
c. /bejt.ha:/	*!	*	**	*
☞ d. /be:.tah/			**	**
e. /be:.tuh/		*!	**	*

Candidates (a), (b), and (c) are discarded first due to a fatal violation of FINAL-C, as they end with a vowel, which is prohibited for feminine pronoun suffixes. Candidate (e) satisfies FINAL-C but is eliminated because it violates the constraint aC] σ for not meeting the requirement of having a high open unrounded vowel preceding the final consonant. As shown in Tableau 1, candidate (d) becomes the optimal choice because it meets the FINAL-C and aC] σ constraints without any fatal violations while avoiding unnecessary syllables, thus making it the most efficient and harmonious form.

(b). Suffix /h/ Preceded by /a:/

Conversely, when the suffix /h/ is preceded by /a:/, as shown in examples (8b), (8d), (8e), and (8h), a similar interaction of constraints occurs involving two additional constraints. The *ʔ-SEMI constraint prevents the preservation of glottal stops in onset positions, while the MAX-C-IO constraint prohibits the deletion of consonants. Tableau 2. illustrates how the optimal candidate in this context maintains a low syllable count while adhering to these important constraints.

Tableau 2. /ða.ˈka:ʔ/ [ðe.ˈka:h] "her intelligence"

Input /ða.ˈka:ʔ/	FINAL-C	*ʔ-SEMI	SE	aC] σ	MAX-C-IO	DEP-IO
a. /ða.ˈka:.ʔu.ha:/	*!	*	****	*		
b. /ða.ˈka:ha:/	*!		***		*	*
☞ c. /ðe.ˈka:h/			**		*	*
d. /ðaˈka.ʔah/		*!	***			*
e. /ða.ˈka.ʔuh/		*!	***	*		*
f. /ða.ˈkaʊ/	*!		**		**	*

Candidates (a), (b), and (f) are eliminated due to a FINAL-C fatal violation as they end with a vowel. In addition, candidate (a) incurs multiple SE violations due to its high syllable count. Candidates (d) and (e) are also disqualified because they violate both *ʔ-SEMI and aC] σ by preserving the glottal stop in an onset position and fail in aC] σ for not having a high open unrounded vowel preceding the final consonant while also incurring additional syllable penalties. This leaves candidate (c) as the optimal output, as it satisfies the FINAL-C constraint by ending in a consonant and the *ʔ-SEMI constraint for deleting the glottal stop in the onset. It also maintains a low syllable count, incurring only two SE violations, which is the lowest among the candidates. Therefore, candidate (c) is the most balanced and efficient output, aligning with all critical constraints.

(c). Exceptional Cases

The data points (8j) and (8m) in QA exemplify unique phonological deviations that necessitate a comprehensive analysis of morphologically influenced sound changes. These exceptions are linked to a specialized form of the Arabic letter alif occurring exclusively in word-final positions, namely ALIF ALMAQSURAH pronounced as a long vowel /a:/. This distinctive alif exhibits atypical behavior when suffixes are appended, resulting in significant phonological and morphological modifications. The underlying process called AL ʔIʕLAAL, which was defined by Al-Usṭurābādhī (2004, p. 720), involves "the elimination or substitution of vowel letters /a/, /w/, and /j/ under specific circumstances".

In QA, this phenomenon manifests as the transformation of the word-final /a:/ (represented by alif almaqsu:rah) into either /j/ or /w/ when the third-person feminine suffix /ha:/ is added. Tableau 3. demonstrates that these cases adhere to the first pattern and use the same constraint ranking. For example, in (8j), the shift from /a:/ to /j/ enhances articulatory efficiency, consistent with QA's tendency toward a phonological economy. Conversely, (8m) presents a more intricate

alternation: the base form /ħuluw/ changes to /aħla:/ to express the superlative, but upon the addition of the feminine pronoun suffix -ha:, it reverts to /w/, yielding /ħıl.wah/.

Tableau 3. /ʕa.la:/ [ʕal.jah] "On her"

Input /ʕa.la:/	FINAL-C	aC] σ	SE	DEP-IO
a. /ʕa.laj.ha:/	*!	*	***	
b. /ʕa.le:.ha:/	*!	*	***	*
c. /ʕa.le:.h/		*!	**	*
☞ d. /ʕal.jah/			**	*
e. /ʕa.la:.ha:/	*!	*	***	

Candidates (a) and (e) are immediately eliminated due to a FINAL-C violation for ending with a vowel. They also incur three violations of SE because of its high syllable count. Candidate (b) shares the same issue with FINAL-C by ending in a vowel, and it also has a DEP-IO violation due to the insertion of the long vowel /e:/, making it non-optimal. Candidate (c) satisfies the FINAL-C requirement but is eliminated for violating the aC] σ condition, as it does not maintain the proper vowel before the final consonant. It also has a DEP-IO violation because of the long vowel inserted. This leaves candidate (d) /ʃal.jah/ as the optimal choice. This candidate satisfies the FINAL-C constraint by ending with a consonant and maintaining a minimal syllable count with only two SE violations. It adheres to the required vowel structure dictated by aC] σ. Therefore, candidate (d) is the winning candidate because it optimally balances the markedness and faithfulness constraints.

The proposed constraint ranking for apocope in Qassimi Arabic (QA) prioritizes the following: FINAL-C, *ʔ-SEMI, aC] σ, SE, MAX-C-IO, and DEP-IO. This hierarchy reflects the dialect's preference for consonant-final words and aversion to glottal stops in certain positions, while also maintaining specific vowel qualities and minimizing syllable count. The analysis reveals that vowel deletion is influenced by a balance between faithfulness to input consonants and penalties for vowel insertion. This comprehensive examination not only clarifies the phonological processes in QA but also enhances understanding of constraint interactions across various Arabic dialects. It emphasizes the importance of investigating both common patterns and exceptions to develop a robust Optimality Theory framework for dialectal phenomena.

VI. Conclusion

This study presents an in-depth examination of apocopes, a distinct phonological process occurring in QA, focusing specifically on the deletion of the final long vowel /a:/. Utilizing the OT framework, this study delves into the interaction between phonological rules and morphological structures, particularly regarding the third-person feminine suffix (-ha:). By analyzing the data collected from several native speakers in the Qassim region of Saudi Arabia, this study contributes significantly to the field of Arabic dialectology, illuminating the unique aspects of QA as it diverges from SA and closely related Najdi dialects. The investigation reveals how the hierarchical ranking of constraints in OT effectively explains the systematic deletion of the final long vowel /a:/ in the third-person feminine suffix -ha: in QA. By pinpointing the markedness and faithfulness constraints that govern the process of vowel deletion, the study aligns with and builds upon previous research on short vowel apocope, in which the FINAL-C constraint emerges as the most influential. Furthermore, like the Najdi dialect, QA consistently eliminates the glottal stop through the application of the *ʔ-SEMI constraint. In this context, the SE constraint plays an essential role in shaping the structure of syllables while fostering phonological economy and promoting optimal pronunciation patterns. The analysis reveals that the unique constraint hierarchies in QA consistently favor structures that end in consonants. The findings shed light on the intricate interplay between phonology and morphology in QA, illustrating that the deletion of the final /a:/ in the third-person feminine pronoun -ha: emerges as a carefully structured phenomenon that is intricately influenced by the specific ranking of constraints within the linguistic system of QA. This systematic vowel deletion not only deepens our understanding of vowel behavior across various Arabic dialects but also highlights vowel apocope as a characteristic phonological feature of QA. In addition, the study addresses the "Alʔiʕlaal" phenomenon, which explains the exceptions to the general deletion patterns observed, such as those involving "alif almaqsu:rah." This exploration adds a layer of complexity to our understanding of vowel deletion in QA, underscoring the need to consider nuances and variations.

Despite its contributions, this study acknowledges certain limitations. Its focus on a specific dialect and phonological process implies that the findings may not be universally applicable across all Arabic dialects or even other languages entirely. Moreover, while the survey conducted was instrumental in defining the study population, further research utilizing a larger sample size and encompassing a more diverse demographic could yield even more comprehensive and robust results. Future research should expand the analysis of apocope by examining additional Najdi dialects, which would help assess how Optimality Theory (OT) constraints explain similar phonological processes across Arabic dialects. Investigations could also consider sociolinguistic factors, utilize acoustic analyses, and explore implications for language acquisition and second language learning in the Arabic linguistic landscape.

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