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| RESEARCH ARTICLE

The Phonemic Status of Affricates in Qassimi Arabic

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| ABSTRACT

This study investigates the phonological status of alveolar affricates in Qassimi Arabic (QA), a variety of Najdi Arabic spoken in central Saudi Arabia. Descriptions of Najdi Arabic typically treat the alveolar affricates [t͡s] and [d͡z] as predictable allophones of the velar stops /k/ and /g/, derived through an affrication process conditioned primarily by front vowels. However, earlier accounts also acknowledge numerous exceptions involving vowel adjacency, consonant clusters, gemination, and lexical origin, raising questions about the productivity and coherence of this proposed rule. Drawing on a dataset of 282 distinct word types collected through wordlist elicitation, natural narration, and silent-film narration from eight native QA speakers, this study re-evaluates the distribution of velar stops and alveolar affricates across a wide range of phonological environments. The analysis examines adjacency to front and non-high vowels, consonant cluster contexts, gemination, and syllable structure, and applies commutation tests to assess phonemic contrast. The results show that alveolar affricates and velar stops occur in overlapping and contrastive environments, including identical phonological contexts where no conditioning rule can predict affrication. Minimal and near-minimal pairs demonstrate direct contrast between /k/ and /t͡s/, as well as between /g/ and /d͡z/, providing clear evidence against an allophonic analysis. Furthermore, affricates are attested in geminate environments and across different syllable structures, indicating that neither gemination nor syllable structure systematically blocks affrication in QA. These findings support analyzing [t͡s] and [d͡z] as independent phonemes in the consonantal inventory of Qassimi Arabic. More broadly, the study underscores the importance of dialect-specific evidence in Arabic phonology and cautions against assuming Classical or Old Arabic segmental inventories as default underlying representations for modern varieties.

| KEYWORDS

Qassimi Arabic; affrication; phonemic contrast; Najdi Arabic; Affricates

| ARTICLE INFORMATION

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1. Introduction

Affricates—defined as single consonantal segments involving a complete oral closure followed by a fricative or delayed release (Lin, 2011)—are widely attested across the world's languages and are particularly common in Arabic varieties, especially those spoken in the Gulf and central Arabia (Holes, 1991; Recasens, 2020). Arabic dialects differ not only in whether they exhibit affricates, but also in which affricates they possess and how they are phonologically analyzed. For example, Kuwaiti Arabic exhibits the affricates [t͡ʃ] and [d͡ʒ], as in [ðiːt͡ʃ] 'that (F)' and [riːd͡ʒ] 'spittle', whereas Qassimi Arabic (QA) exhibits the alveolar affricates [t͡s] and [d͡z], as in [ðiːt͡s] 'that (F)' and [riːd͡z] 'spittle' (Johnstone, 1963; Holes, 2004).

In much of the literature on Arabic phonology, the occurrence of such affricates has been attributed to velar affrication / palatalization, whereby velar stops change their manner of articulation and surface as affricates (Shriberg & Kwiatkowski, 1980; Recasens, 2020). For Najdi and related Gulf varieties, a widely held assumption is that the velar stops /k/ and /g/ affricate to [t͡s] and [d͡z], respectively, in the vicinity of high front vowels (Johnstone, 1963; Ingham, 1994; Prochazka, 1988; Mahzari, 2023;

Mahmoud, 2020). Under this view, the alveolar affricates are predictable allophones, with their distribution determined by phonological environment.

The present study re-evaluates this assumption for Qassimi Arabic. Specifically, it tests whether the alternation between velar stops (/k, g/) and alveolar affricates ([t͡s, d͡z]) in QA is indeed environmentally conditioned, or whether the two sets of segments occur in overlapping and contrastive distributions. Building on recent work that questions purely rule-based accounts and highlights lexical and social conditioning in Najdi and Gulf affrication (Al-Rojaie, 2013; Szreder et al., 2021, 2023; Mahzari, 2023; Albaty, 2025), the study uses naturally occurring and elicited data to argue that [t͡s] and [d͡z] in QA cannot be straightforwardly derived from velars via a productive synchronic rule. Instead, the evidence supports analyzing them as independent phonemes in the QA consonant inventory.

Qassimi Arabic [gasˤiːmiː] is a variety of Najdi Arabic spoken by approximately 930,000 speakers in the Qassim region of central Saudi Arabia (Al-Rojaie, 2013). The relative geographical isolation of the Najd region has often been linked to the preservation of local phonological features (Holes, 2004; Mahzari, 2023). Although QA is commonly classified as a Najdi sub-variety (Johnstone, 1963, 1967; Ingham, 1994), it exhibits several phonological properties that distinguish it from other Najdi dialects, including the loss of the voiceless uvular stop /q/, deletion of coda /ʔ/ with compensatory lengthening (e.g. /raʔs/ → [raːs] 'head'), and the systematic presence of alveolar affricates [t͡s, d͡z] (Prochazka, 1988; Alrashed, 2025; Mahzari, 2023). Sociolinguistically, affrication in Qassim has been linked to local, rural or Bedouin identity and is receding among younger, more educated speakers (Al-Essa, 2009; Al-Rojaie, 2013).

Phonologically, QA has a vowel system consisting of four short vowels (/i, u, a, ɑ/) and five long vowels (/iː, eː, aː, oː, uː/) (Alrashed, 2025). Its consonant inventory includes velar stops, alveolar stops, alveolar fricatives, and alveolar affricates, as independently confirmed by recent acoustic work on QA affricates [t͡s, d͡z] (Albaty, 2025). The coexistence of alveolar stops ([t, d]), alveolar fricatives ([s, z]), and alveolar affricates ([t͡s, d͡z]) raises a classic analytical question: should surface [ts] and [dz] in QA be analyzed as consonant clusters or as single affricate segments (cf. Elhija Mahajna & Davis, 2016)?

QA phonotactics provide crucial evidence. QA permits complex onsets and codas, but with a strict upper limit of two consonants per syllable margin, yielding a basic syllable template of (C)CV(V)C(C) (Al Motairi, 2015). Since three-consonant clusters are not permitted in onset or coda position, sequences such as [t͡sla] 'kidneys' and [ʕald͡z] 'burnt' are best analyzed as containing single affricate segments rather than stop–fricative clusters. Establishing the segmental status of these affricates is therefore a necessary foundation for the broader question pursued in this paper: whether their distribution in QA supports an allophonic or a phonemic analysis.

2. Literature Review

2.1 Affricates and Affrication

Affricates are widely attested cross-linguistically and constitute a common segment type in many languages. According to the UCLA Phoneme Segment Inventory Database (UPSID; Maddieson & Precoda, 1990), approximately 67% of the surveyed languages contain at least one affricate, with alveolar affricates [t͡s] and [d͡z] among the most frequent types, highlighting their typological naturalness. Affrication is commonly described as a process whereby a stop consonant surfaces with frication at release, often in response to contextual phonetic pressures. Historical and synchronic affrication of velar stops in the vicinity of front vowels is well documented, including Italian varieties in which /k, g/ affricate to [t͡s, d͡z] before /i, e/ (Calabrese, 1993), as well as several languages discussed in typological work on velar palatalization and affrication (Pöchtrager, 2021). These parallels have frequently been invoked to motivate similar analyses for Arabic varieties (Albaty, 2025; Mahzari, 2023).

2.2 Affrication in Arabic: Historical and Morphological Contexts

Within Arabic linguistics, affrication has often been framed in relation to historical Old Arabic phenomena such as Kashkasha and Kaskasa, where /k/ surfaces as [ʃ] or [s] in the second person singular feminine possessive suffix /-k(i)/ across morpheme boundaries (Holes, 1991). Holes (1991) links these alternations to later Peninsula patterns in which Old Arabic /k, q/ yield [t͡s], [t͡ʃ], [ʃ], [d͡ʒ], or [d͡z] word-internally, with front vowels implicated in initiating the changes (Mahzari, 2023; Al-Essa, 2009).

Johnstone (1967), however, argues that suffixal affrication must be distinguished from stem-internal patterns. For Qassimi and Kuwaiti Arabic, he proposes that [-t͡s] and [-t͡ʃ] in the 2sg.f possessive function as morphologically conditioned allomorphs of /-

k(i)/, rather than outputs of a general phonological rule, since they occur even without front vowels. Forms such as (1)–(4) thus support an analysis where suffixal affrication is independent of vowel conditioning and distinct from stem-internal alternations.

(1) [əˈbuː-t͡s] 'your father' (QA)
(2) [əˈbuː-t͡ʃ] 'your father' (Kuwaiti Arabic)
(3) [ʕsˤɑː-t͡s] 'your stick' (QA)
(4) [ʕsˤɑː-t͡ʃ] 'your stick' (Kuwaiti Arabic)

2.3 Affrication within Word Boundary

In contrast, stem-internal affrication has typically been treated as environmentally conditioned. Johnstone (1963) proposes that in QA, [t͡s] and [d͡z] occur near front vowels [iː, i, eː], as illustrated in (5)–(8), and that affrication can extend across non-emphatic consonant clusters but is blocked in geminates.

(5) [t͡siθiːr] 'much (sg.)'
(6) [θid͡ziːl] 'heavy (sg.)'
(7) [kθaːr] 'much (pl.)'
(8) [θgaːl] 'big (pl.)'
(9) [iħt͡s] 'talk'
(10) [ʕird͡z] 'vein'
(11) [galb] 'heart'
(12) [t͡sibiːr] 'big'
(13) [rifiːd͡z] 'companion'

Subsequent descriptions generalized this pattern to Najdi Arabic as a whole, treating /k, g/ → [t͡s, d͡z] as allophonic alternations triggered by front vowels (Al-Rojaie, 2013; Mahzari, 2023; Alrasheedi, 2015). More recent work adds complexity. Al-Rojaie (2013) models affrication probabilistically, showing that high front vowels most strongly favour [t͡s, d͡z], with reduced rates elsewhere and systematic effects of age, gender, and education, and also distinguishing categorical suffixal [-t͡s] from variable stem affrication (Al-Rojaie, 2013).

Rule-based approaches for Haʾili Arabic similarly analyze /k, g/ ~ [t͡s, d͡z] as vowel-conditioned, but require additional devices such as OCP-based blocking and vowel lowering fed by affrication (Alrasheedi, 2015). In Qassimi Arabic, descriptive work and acoustic analysis suggest that /ts, dz/ pattern as independent segments contrasting with /k, g/, and that affrication is not uniformly predictable from vowel environment (Albaty, 2025; Mahzari, 2023). Parallel studies of Emirati Arabic reveal extensive lexical, phonological, and sociophonetic conditioning in affricate variation and support the view that some alternations reflect ongoing sound change rather than a single categorical rule (Szreder & Derrick, 2023; Szreder et al., 2021).

2.4 Summary of Problems in Existing Accounts

Despite broad agreement that vowel quality influences affrication, existing analyses face several unresolved issues. Affrication is reported at non-local distances from front vowels (Al-Rojaie, 2013; Mahzari, 2023; Alrasheedi, 2015); is blocked in particular lexical strata (loanwords) and in geminate contexts, calling its synchronic productivity into question (Al-Rojaie, 2013; Mahzari, 2023; Alrasheedi, 2015); and is claimed to be sensitive to OCP effects, which substantially complicates the representation of /k, g/ and their outputs (Alrasheedi, 2015). Moreover, proposed triggering vowels—high, front, and low—do not form a consistent natural class across accounts (Al-Rojaie, 2013; Mahzari, 2023; Alrasheedi, 2015). These complications make it doubtful that QA affricates can be derived everywhere by a single, exception-free phonological rule.

2.5 Significance and Research Questions

Affrication, even when historically grounded, may be synchronically unpredictable and morphologized (Pöchtrager, 2021; Youssef, 2014; Ulfsbjorninn, 2021). While most previous research implicitly assumes that Qassimi Arabic patterns with Najdi Arabic more generally (Al-Rojaie, 2013; Mahzari, 2023; Alrasheedi, 2015), recent findings on QA affricates and Najdi sound change point to dialect-specific behavior that warrants independent analysis (Albaty, 2025; Mahzari, 2023; Alsalim, 2025; Al-Rojaie, 2020).

Using a broad set of naturally occurring and elicited forms, this study reassesses whether QA [t͡s, d͡z] are in complementary distribution with /k, g/ or whether they occur in overlapping and contrastive environments, as suggested by acoustic and morphological evidence (Albaty, 2025). In addition, the study explores whether syllable structure conditions or blocks affrication, a factor largely neglected in prior work on Najdi and Gulf affrication (Szreder & Derrick, 2023; Szreder et al., 2021; Mahzari, 2023).

Adopting a synchronic perspective that does not presuppose Classical or Old Arabic underlying forms, the study evaluates the phonemic status of QA affricates using distributional patterns and commutation tests. It addresses the following research questions:

1. Is the distribution of alveolar affricates [t͡s, d͡z] in Qassimi Arabic predictable from phonological environment, particularly vowel context?
2. Do velar stops and alveolar affricates in QA occur in complementary distribution, or do they exhibit overlapping and contrastive distributions indicative of distinct phonemes?
3. Does syllable structure play a systematic role in conditioning or blocking affrication in QA?

By answering these questions, the study clarifies whether QA affrication should be analyzed as a productive phonological rule, a residual historical pattern, or evidence for an expanded consonantal inventory.

3. Methodology

3.1 Data set

The data analyzed in this study were collected in the Qassim Region of Saudi Arabia, with recordings conducted in Buraidah, the region's capital and most populous city. Buraidah was selected to ensure access to speakers who regularly use Qassimi Arabic (QA) in daily interaction and to capture patterns representative of the variety (Albaty, 2025; Alhoody & Aljutaily, 2020).

3.2 Participants

The study recruited eight native speakers of Qassimi Arabic (four females and four males). Participants completed a demographic questionnaire and were included if they met the following criteria: they were born and raised in the Qassim Region, reported using QA as their primary spoken variety, had no known speech-related impairments, and had no formal education beyond high school. The education criterion was adopted to minimize potential influence from extended exposure to Modern Standard Arabic (MSA), particularly in post-secondary educational settings, a factor shown to affect segmental realizations in other Arabic dialect research (Kulikov, 2021; Mahzari, 2023; Alkhudair & Aljutaily, 2022).

To further verify dialectal affiliation, prospective participants were asked to narrate a short story. A native speaker of QA evaluated these narrations for dialectal consistency. This screening procedure follows recommendations that speaker status should be verified when the target variety coexists with other dialects in the same speech community (Ladefoged, 2003), and parallels dialect-verification practices in recent QA and Najdi studies (Albaty, 2025; Mahzari, 2023; Alhoody & Aljutaily, 2020; Alwatban & Alhoody, 2025). After eligibility was confirmed, participants were invited to take part in the study.

All participants provided informed consent prior to recording, and all data were anonymized for analysis and reporting. Recording sessions were conducted individually, with multiple sessions scheduled per participant to reduce fatigue and to avoid potential priming effects from other speakers.

3.3 Materials and procedure

Recordings were made using a Zoom H4nSP digital recorder set to a 22,000 Hz sampling rate and a Shure SM10A head-mounted microphone, comparable to equipment used in recent acoustic work on Arabic obstruents (Albaty, 2025; Kulikov, 2021).

Data were collected using three production contexts:

1. Wordlist elicitation:
   A targeted wordlist was constructed to include lexical items containing velar stops or alveolar affricates in a range of phonological environments, including adjacency to different vowel qualities and consonant cluster contexts. The wordlist was presented in Arabic orthography, and participants were asked to produce each item three times, following common practice in segmental production studies (Albaty, 2025; Kulikov, 2021; Szreder et al., 2021). Although Arabic orthography does not explicitly represent alveolar affricates, QA speakers reliably produce [t͡s] and [d͡z] in expected lexical items (Albaty, 2025; Alhoody & Aljutaily, 2020; Albawardi, 2023). For example, the word pronounced as [baːt͡sir] 'tomorrow' is orthographically represented with ⟨ك⟩ as [baːkir], yet QA speakers consistently realize it with an affricate (Albawardi, 2023).
2. Natural narration:
   Participants narrated a short story in their own words. All lexical items containing the target segments [k, g, t͡s, d͡z] were later extracted from these recordings. The use of spontaneous narrative speech is well-established in research on QA and Najdi phonology to capture unmonitored patterns and ongoing sound change (Mahzari, 2023; Albawardi, 2023; Alkhudair & Aljutaily, 2022).
3. Silent-film narration:
   Participants watched a five-minute silent video and described the events they observed. As with the natural narration task, all words containing the target segments were extracted for analysis. Silent-film narration has been widely adopted to elicit relatively controlled but content-rich speech in Arabic segmental studies (Szreder & Derrick, 2023; Szreder et al., 2021).

The use of both controlled elicitation and more naturalistic speech tasks was intended to increase the robustness of the dataset and reduce task-specific stylistic effects, in line with mixed-style designs in recent work on QA and Gulf affrication (Albaty, 2025; Szreder & Derrick, 2023; Mahzari, 2023; Szreder et al., 2021).

3.4 Data coding and analytic approach

The final dataset consisted of 282 distinct word types (not tokens). Each item was transcribed and coded for its phonological environment. The analysis examined whether velar stops (/k, g/) and alveolar affricates ([t͡s, d͡z]) occur in complementary distribution, overlapping distribution, or contrastive environments, an approach consistent with distributional tests for phonemic status in QA affricates and other Najdi segmental contrasts (Albaty, 2025; Mahmoud, 2020; Mahzari, 2023; Alwatban & Alhoody, 2025).

In addition to immediately adjacent vowel context, the analysis also considered non-adjacent front vowels as potential conditioning factors, following claims that vowel effects may extend across intervening consonants such as liquids and nasals (Johnstone, 1978; Mahzari, 2023). Morphologically related forms (e.g., singular–plural pairs) were examined to assess the consistency of alternations across paradigms, echoing previous arguments that morphological behaviour is crucial for distinguishing affricate phonemes from allophonic outputs in QA and Najdi varieties (Albaty, 2025; Mahmoud, 2020; Mahzari, 2023; Albawardi, 2023).

Finally, all items were syllabified to evaluate whether syllable structure systematically conditions or blocks affrication. Syllabification followed the constraints and analyses proposed for Qassimi Arabic in Al Motairi (2015) and Alhoody and Aljutaily (2020, 2022), including restrictions on complex onsets and codas and the distribution of superheavy syllables (see also Alwatban & Alhoody, 2025). These analyses were cross-checked against the descriptive account in Johnstone (1963).

4. Results and Discussion

The analysis of the 282 word types shows that the alveolar affricates /t͡s/ and /d͡z/ occur in overlapping and fully contrastive environments with the velar stops /k/ and /g/. This pattern is incompatible with an allophonic account tied to a single phonological rule and instead motivates treating /t͡s, d͡z/ as independent phonemes in Qassimi Arabic (QA), a conclusion convergent with recent acoustic work that also treats QA affricates as phonemically distinct from /k, g/ (Albaty, 2025; Alhoody & Aljutaily, 2020). No systematic role is found for syllable structure in conditioning affrication: affricates occur in onsets and codas, in simplex and complex syllables, and in both singleton and geminate positions.

4.1 Front vowel adjacency

Previous Najdi and Gulf accounts identify front vowels as the primary conditioning environment for velar affrication (Mahmoud, 2020; Mahzari, 2023). QA certainly has affricates adjacent to front vowels, as in (17).

(17)
a. [tar͡tsiːb] 'installation'
b. [ðiː͡ts] 'that'
c. [diː͡ts] 'rooster'
d. [ħariː͡dz] 'fire'
e. [ʃaː͡dziː] 'diligent'
f. [jɪnzɪrɪ͡dz] 'brag'
g. [jɪsˤadɪ͡dz] 'believe'
h. [saː͡dzi] 'irrigation channel'
i. [jɛdall͡ɪts] 'massage'

However, velar stops also occur immediately next to front vowels, as in (18).

(18)
a. [mɪskiːn] 'poor'
b. [jɛʃkiː] 'to complain'
c. [sɪliːg] 'traditional food'
d. [rɛgiːb] 'observer/surgeon'
e. [jazrɪg] 'rush'
f. [jɪdɪg] 'to hit'
g. [saːgi] 'my leg'
h. [maːlɪk] 'owner'

Crucially, near-identical phonological environments host both segment types. The pair [jɪsˤadɪ͡dz] 'believe' (17g) vs. [jɪdɪg] 'hit' (18f) shares the same syllable structure and vowel quality, with the target consonant in word-final coda position following the same vowel. This overlap directly contradicts accounts in which adjacency to front vowels is sufficient to predict affrication in Najdi (Mahmoud, 2020; Mahzari, 2023). Appeals to lexical origin or borrowing do not salvage a purely phonological rule, since culturally local items such as [sɪliːg] 'traditional food' (18c) retain velars in environments where affricates are otherwise common, paralleling exception-rich patterns observed in Najdi and Emirati affrication (Mahzari, 2023; Szreder et al., 2021).

4.2 Non-high vowel adjacency

Some work extends the triggering environment to non-high vowels (e.g., /a/) (Mahzari, 2023). QA affricates indeed occur adjacent to non-high vowels, as in (19).

(19)
a. [halaː͡ts] 'bane'
b. [jɪtəmadʃa͡ts] 'fall'
c. [t͡saff] 'palm'

Yet velar stops appear in identical contexts, as in (20).

(20)
a. [kallaːk] 'liar'
b. [kəʃak] 'rusk'
c. [kafz] 'to fold'

The near-minimal contrast [t͡saff] 'palm' (19c) vs. [kafz] 'to fold' (20c) shows that /a/ does not uniquely condition affrication. Similar to the front-vowel cases, both /k/ and /t͡s/ occur in comparable segmental and syllabic environments. This mirrors

broader typological observations that once diachronic velar assibilation has taken place, synchronic alternations often become lexically idiosyncratic and no longer follow a simple vowel-based rule (Recasens, 2020).

4.3 No vowel adjacency: consonant clusters

Cluster environments have been used to refine vowel-based proposals. Johnstone's (1963) description for Najdi suggests that affrication in clusters is limited to cases where the cluster is preceded by a front vowel and where the non-affricate in the cluster is /l, r, n/. Some QA examples are compatible with this description, but many are not.

(21)
a. [ʃɪl͡ts] 'bubble gum'
b. [ir͡ts] 'support'
c. [ʁar͡dz] 'drown (adj.)'
d. [ħar͡dz] 'burnt'
e. [ħar͡ts] 'active'
f. [ħam͡dz] 'angry'

In (21c–f), affricates occur in clusters without preceding front vowels. Affricates also appear in clusters where the accompanying consonant is neither /l, r, n/, as in (22).

(22)
a. [t͡sðaːr] 'many'
b. [t͡sʃaːbɪh] 'traditional game'
c. [dab͡ts] 'name of a place'

These patterns undermine proposals that tightly restrict cluster affrication. Furthermore, the absence of affrication in forms like [kleːdʒa] 'traditional food', which satisfy Johnstone's structural conditions, indicates that cluster environments also fail to deliver a categorical rule.

One might attempt to derive clusters containing affricates from high-vowel deletion (HVD) (Szreder et al., 2021). However, this explanation cannot extend to word-final or monosyllabic clusters, where HVD is not expected to apply, and thus does not provide a uniform conditioning factor. Comparable difficulty in deriving cluster affrication from a single phonological process is reported in Najdi and Emirati variation studies, where cluster-internal affrication shows strong lexical and speaker-specific effects (Szreder & Derrick, 2023; Szreder et al., 2021).

4.4 Geminate affricates

Earlier descriptions of Najdi claim that gemination blocks affrication (Mahmoud, 2020). QA data clearly contradict this. Geminate affricates are well attested:

(23)
a. [wɛd͡atsː] 'animal fat'
b. [sɪt͡sːiːn] 'knife'
c. [ħɪt͡sːɪh] 'scratching'
d. [lad͡zːim] 'put (IMP)'
e. [ðʃat͡sː] 'slaughter (IMP)'
f. [bat͡sː] 'make someone cry'
g. [datsː] 'make something even'

Forms (23d–g) are particularly revealing: they arise from productive imperative morphology that regularly yields geminate alveolar affricates. Geminate affricates are also robustly distinguished by duration, in line with cross-linguistic findings that gemination in affricates is primarily cued by lengthening of closure and/or total consonant duration (Albaty, 2025; Di Benedetto & Nardis, 2020). These patterns demonstrate that gemination neither blocks affrication nor forces a reversion to velars, weakening attempts to preserve an allophonic analysis by invoking geminate immunity (Mahmoud, 2020).

4.5 Phonemic contrast and commutation

The clearest evidence for the phonemic status of QA affricates comes from minimal and near-minimal pairs in identical environments. The pairs in (24) show that /t͡s/ and /k/ contrast directly.

(24)

a. /jɪmkɪn/	'maybe'	vs.	/jɪmt͡sɪn/	'overtake'
b. /jɛkfi/	'enough'	vs.	/jɛt͡sfi/	'to flip'
c. /ka:n/	'be (past)'	vs.	/t͡sa:n/	'if'

Because the segmental and syllabic environments are identical, the semantic contrast cannot be attributed to contextual conditioning. Such pairs parallel the distributional and morphological evidence for a /ts/ vs. /k/ contrast reported in other QA work (Albaty, 2025; Alhoody & Aljutaily, 2020).

Additional support comes from commutation tests. Replacing /t͡s/ with /k/ in otherwise phonotactically well-formed words yields unacceptable outputs, as in (25).

(25)

a. /t͡sħa:li/	'a bird'	vs.	*[kħa:li]
b. /t͡sʕa:bɪh/	'traditional game'	vs.	*[kʕa:bɪh]
c. /dabt͡s/	'name of a place'	vs.	*[dabk]
d. /tso:lih/	'kerosene lantern'	vs.	*[ko:lih]

Comparable patterns hold for the voiced series. The pairs in (26) show that /g/ and /d͡z/ occur in overlapping environments without any systematic conditioning.

(26)

a. /ʃɛlɛd͡z/	'burnt'	vs.	/gɛlɛg/	'worried'
b. /d͡zarn/	'horn'	vs.	/garm/	'efficient'
c. /jad͡zlɪb/	'flip'	vs.	/jagli/	'fry'

No single phonological rule—whether based on vowel quality, syllable structure, or cluster type—can predict where /d͡z/ appears here. Together with acoustic evidence that /ts, dz/ form a robust affricate category distinct from /k, g/ in temporal properties (Albaty, 2025), these distributional and commutation facts strongly support analyzing /t͡s/ and /d͡z/ as phonemes in QA.

Overall, the QA data align more closely with accounts that treat velar affrication in Najdi-area dialects as a historically grounded but now partly lexicalized change, with affricates integrated into the consonant inventory, rather than as outputs of a single, still-productive allophonic rule (Albaty, 2025; Mahzari, 2023; Pöchtrager, 2021).

5. Conclusion

This study re-examined the status of alveolar affricates in Qassimi Arabic (QA) using a dataset of 282 word types drawn from elicited and naturalistic speech. Earlier accounts of Najdi Arabic typically analyze [t͡s] and [d͡z] as predictable allophones of /k/ and /g/, derived via an affrication process conditioned primarily by (high) front vowels (e.g. Johnstone, 1963; Ingham, 1994; Prochazka, 1988; Al-Rojaie, 2013). The QA data presented here do not support such an analysis. Across the environments most often cited as conditioning factors—front-vowel adjacency, non-high vowel adjacency, consonant clusters, and gemination—velar stops and alveolar affricates were found to occur in overlapping distributions, undermining a rule-based derivational account.

The strongest evidence comes from commutation: /k/ contrasts with /t͡s/ in identical phonological environments (e.g. /jɪmkɪn/ 'maybe' vs. /jɪmt͡sɪn/ 'overtake'), and /g/ patterns similarly with /d͡z/ in overlapping environments where no phonological rule plausibly predicts the affricate (e.g. /d͡zarn/ 'horn' vs. /garm/ 'efficient'). Minimal and near-minimal pairs of this type provide clear evidence that /t͡s/ and /d͡z/ function as independent phonemes in QA rather than as contextually conditioned realizations of velar stops. Additionally, syllable structure did not emerge as a systematic trigger or blocker of affrication: affricates occurred across

syllable types and in both onset and coda positions, contra proposals that appeal to cluster structure or gemination as categorical constraints (cf. Johnstone, 1963; Al-Rojaie, 2013).

More broadly, the results underscore the importance of dialect-specific evidence in Arabic phonology. Analyses that take Classical or Old Arabic segmental inventories as default underlying representations risk obscuring synchronic contrast in modern spoken varieties, particularly in dialects where affricates are robust and socially salient (Holes, 1991, 2004; Mustafawi, 2007; Alrasheedi, 2015). From a typological and diachronic perspective, the QA pattern aligns with models in which phonetically natural processes such as velar affrication can become phonemic once conditioning environments erode and new segmental contrasts are established (e.g. Ohala, 2014; Hyman, 2013; Calabrese, 1993).

Future work can extend the present findings in at least two directions. First, perception experiments are needed to determine whether QA listeners treat [ts͡][k] and [dz͡][g] as robust contrasts across lexical and morphological paradigms, and how these contrasts interact with social-indexical meanings in the speech community (cf. Al-Essa, 2009). Second, comparative dialectal studies can examine whether similar phonemicization patterns occur in other Najdi and Gulf varieties with affricates (e.g. Kuwaiti, Qatari, and Ha'ili Arabic), thereby refining the typology of affricates in Arabic and clarifying how historically affricated reflexes of /k/ and /q/ become synchronically stabilized as independent phonemes (Holes, 1991; Mustafawi, 2007; Alrasheedi, 2015; Albaty, 2025). Such work would contribute to broader theories of sound change, neutralization, and phonologization in the domain of affrication.

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