



Arabic Vowels: Misconceptions Clarified

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ABSTRACT

Purpose: Contrary to the prevailing scholastic agreement that the Arabic language has only six vowels, three of them being short (a, i, u) and three of them long (ā, ī, ū), this study indicates the presence of a much more complicated vowel inventory in the Arabic language. By adopting a mixed-method approach that combines qualitative and quantitative evidence, this paper presents an intricate, empirical examination of the Arabic phonology system. **Methodology:** The study employed acoustic analysis combined with manual phonetic transcription and statistical tests for Quranic Standard Arabic and Modern Standard Arabic. It named eight different short vowels and a complicated cluster of diphthongs and triphthongs. The study involved different data sets which included religious texts as well as conversational clips that used intricate sampling techniques for representative sampling across dialects.

Findings: The findings challenge conventional views in terms of the number of perceived Arabic vowels (which turned out to be around 24), as well as providing directions and inputs for future work with a phonology-based framework. Such an inclusive view seeks to enhance the appreciation of the complexities of phonology in Arabic speech. **Implications to Research and practice.** future researchers should pay attention to vital issues like school curricula exploring the Arabic vowel system.

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Introduction

Arabic has a complex phonological system. It is an extensively underplayed Semitic language spoken in the Middle East and North Africa that has attracted numerous scholarly probes (Al Malwi et al., 2023; Alqarni, 2018; Muslimin et al., 2021; Saigh & Schmitt, 2012). Most of these academic studies have tackled different phonological aspects, including vowel timbre, durational characteristics, and coarticulatory mechanisms, mostly based on the textually scribed or normatively codified Arabic dialects (Brown & Hellmuth, 2022; Davis, 2019). These intellectual discourses have witnessed a shift towards its spoken forms, revealing important differences between its standardized and vernacular varieties with regard to vowel production and sound. The major intellectual convention based in the academic framework mostly takes a reductionist stand, frequently limiting the Arabic vowel inventory down to a triplet of short vowels and their long counterparts (Jadalla & Lee, 2012). This interpretation clearly fails to capture the intricate sonorous palette that is displayed in vowel inventories of spoken Arabic and does not deviate from the six vowels usually recognized (Sedeek, 2019).

However, despite the growing scholarly enthusiasm for spoken Arabic idioms, a remarkable gap is yet evident in the existing body of research concerning its vowel architecture. To fill this gap, and due to the dearth of extensive research on the subject, this study primarily centered on vowel systems in different spoken Arabic dialects, which comprises a set of short and long vowels that play a crucial role in the phonology of the Arabic language (Mashaqba et al., 2023). The study aimed to achieve a number of objectives, including the examination and analysis of the vowel systems in a number of spoken Arabic dialects; filling a gap in scholarship by addressing the current lack of research on this aspect of Arabic phonology; challenging the widespread claim that the Arabic vowel system primarily consists of six cardinal vowels, hinting instead at a much more complex vowel inventory in the oral languages of the Arabic dialects; and providing a detailed acoustic and phonetic analysis of the Arabic vowel sounds in a variety of phrases from the Quran and Modern Standard Arabic (MSA), so as to provide a richer and more informed base for the ongoing scholarly discourse on the fitness of the adopted model of six vowel sounds for Arabic (Almbark & Elgibreen, 2019).

Essentially, this study also questions the dominant misconception of only six primary vowels used in the Arabic vowel system. To this end, the study sets out to provide a detailed acoustic and phonetic examination of vowel sounds in a range of sentences uttered by an assortment of speakers, enhancing the robustness with which scholars can engage in academic discourse as they comprehensively analyze the robustness of the accepted six-vowel model. In line with these objectives, the study attempted to answer the following two questions:

1. How accurate is the notion that Arabic is split into only six vowel phonemes, in light of dialectal diversity?
2. What is the typical vowel inventory of Modern Standard Arabic, and how does this bear on the pronunciation and orthography of the language in different parts of the Arabic world?

Therefore, this study provides a more comprehensive understanding of Arabic vowels, contributing to the growing body of research on spoken Arabic and its phonological system.

Literature Review

The current literature on Arabic vowels examines in depth the crucial elements of the phonetic and phonological domains. This body of work is of great importance considering that it covers such aspects as phonological vowel length (phonemic), one of the critical aspects in the complex auditory system. Previous research has demonstrated that vowel length is multi-dimensional and manifests itself in various forms such as duration, acoustic features, and speech segments (Newman, 2002). Other studies that focus on length have gone hand in hand with the research on the quality of vowels, especially concerning front, center, and back categorizations impacted by numerous phonological factors such as stress, coarticulation, and phonotactics (Haddad & Al-Nasheri, 2019).

An equally important issue is literature on coarticulation – it is an essential topic which considers vowel-consonant interaction in the Arabic phonetic system. In this area, vigorous exploration has been done mainly with respect to pharyngeal and uvular consonants involving their phono-acoustic characteristics. These trends are magnified on a close look in some studies (Behnstedt & Woidich, 2013; Haddad, 2017) which used the experimental methods involving Electromagnetic Articulographs and microphones to analyze the acoustic differences between long and short vowels, where duration and frequency components were significantly different (Newman, 2002). These studies also reveal how non-native Arabic vowel perception arises among native speakers, focusing on linguistic factors such as phonetics and phonemes. Another important body of research comprises historical and comparative studies. Al-Khatib's (2006) descriptive study was based on comparison of vowels found in 25 dialects. Likewise, Bahloul (2004); Belalimat (2010); Owens (1988) adopted different approaches towards the total and good vowels in various types of Arabic, including Modern Standard Arabic.

Almurashi et al. (2024) studies an important issue concerning the phonetic specification of vowels in Hijazi Arabic, which reveals the prominent phonetic features that characterize the set of vowel sounds in the Hijazi Arabic dialect. Comprising acoustic analysis procedures and examining the uniqueness of these vowels in the aspect of duration, pitch, and harmonics, this study clarifies how vowels constantly change their characteristics in different linguistic surroundings. This investigation extends the view of such capability and variety throughout the phonetic environment, helping locate the Arabic dialect in the structure of the Arabic phonetic landscape via comparing these characteristics with other Arabic dialects. The key theoretical framework of the study is solid, and it incorporates concepts from well-established phonetic and linguistic theories, giving weight to the work that aims to enhance our knowledge of the speech production of Hijazi Arabic by describing in detail the dynamics of its vowel system and by mapping these findings in the broader linguistic and sociolinguistic features of this dialect.

Haddad's (2023) book "Introduction to Arabic Linguistics," published by John Wiley & Sons, is an introductory examination of the structures and phonetic features of the Arabic language. Concentrating in particular on Arabic vowels, the book systematically analyzes their phonologic characteristics, articulation attributes, and their function in the morphological organization of Arabic. Using a plain, academically rigorous style, Haddad (2023) walks the reader through the complications of vowel variation across Arabic dialects, emphasizing the diversity and richness in vowel sounds of the language. Illustrated by examples and theoretical insights, the text reveals the dynamic character of

vowel articulation, including such aspects as vowel length, nasality, and influence of surrounding consonants on vowel quality. In addition to making a great contribution to the reader's knowledge of Arabic phonetics and phonology, this academic piece serves the field of linguistics by providing a thorough account of the problems and subtleties of the study of Arabic vowels. Based upon this thorough overview, [Haddad \(2023\)](#) seeks to offer a resource that linguistics and students alike will find beneficial in bringing theoretical understanding and practical linguistic analysis together to fully appreciate the linguistic heritage of Arabic.

[\(Mohammed, 2023\)](#) starts with a comparative and contrastive investigation of vowels used both in Arabic and English to show their relationship and help people learn these different languages. The goal of the research is to carry out a selective study involving thirty learners of English at the Department of English Language, College of Education, Saber, University of Aden, and determine the vowel challenge, noting that some vowels of English are available while others are not corresponding to them as is with Arabic. The research focuses on how vowel spelling mistakes result in correct pronunciation. This study uses several tools and comparative and contrastive methodologies that are applied to data collected from video recordings to recommend concrete measures for improving English vowel pronunciation among Arabic speakers. The phonetic contrasts between the vowel systems of English and Arabic highlighted in the work of [Mohammed \(2023\)](#) are useful for insights and solutions that can assist students in overcoming language barriers; consequently, the students are able to improve their communication skills in general.

[Al Anshori et al. \(2023\)](#) engage in a comprehensive study to elucidate the dialectal distinctions between Saudi Arabian and Egyptian 'Ammiya Arabic, as documented in the *Arabi: The Arabic Matters Journal*. Considering dialects as deviations within a broader linguistic community due to geographical and anthropological factors, this study explores particular phonetic and morphological aspects that mark these two dialects. The study utilizes a qualitative library research methodology and a descriptive-analytical data analysis approach and makes use of deductive reasoning to draw attention to changes in pronunciation, letters, and harakat. The results reveal the phonetic variations in terms of sound alternation, addition, and elimination, as well as the morphological differences in patterns of word formation (wazan), providing thought-provoking views on the linguistic diversity in the Arabic language.

[Abed \(2022\)](#) provides a pedagogical study that is specially done through a specific vowel quality in different dialects of Iraqi Arabic, as published in the *WORD journal*. Employing a systematic methodology, the study probes into the unique vowel sounds which are characteristic of these dialects through their acoustic features and phonetic alterations. The study utilizes a qualitative approach in order to characterize the difference in vowel quality, such as differences in vowel height, backness, and rounding, providing a typological outlook on the vowel system of Iraqi Arabic. [Abed's \(2022\)](#) analysis illustrates the underlying complexity of the variation of vowel sounds in different regions and communities of Iraq. It allows one to see the complete picture of the linguistic diversity in the Arabic language. The results emphasize the role of regional dialects in defining the phonetic system of Arabic and reveal the complexity of vowel articulation in Iraqi Arabic. This article contributes to the body of Arabic phonetics knowledge and lays a basis for further work on dialectal variations within this language.

The phenomenon of affricate variability in Emirati Arabic is outlined by [Szedrer and](#)

Derrick (2023), with particular emphasis on the phonological contexts that condition these variations. This study uses extensive phonetic analysis to identify the patterns of affricate production in various linguistic contexts. It examines speech data from native Emirati speakers of Arabic to define the major phonological factors that control the realization of affricates, exposing how these sounds oscillate in place and manner of articulation in response to their phonetic environments. This study is an important contribution to the understanding of Arabic phonology by pointing out the active role of affricate sounds and phonological conditioning in shaping speech variation. It not only furthers the understanding of Arabic dialectology but also offers insights into more general mechanisms of phonetic variation and change within languages.

In their study, Al-Deaibes and Jarrah (2023) tackle the issue of Arabic geminate production by English speakers, shedding light on the difficulties and ways of acquiring non-native phonetic impressions. In a detailed phonetic analysis, this study investigates the way speakers of English, with less phonemic emphasis on consonantal length, pronounce Arabic geminate consonants. Geminates, or long consonants, are a trademark of Arabic phonology and present a special hindrance to learners because of their difference from singleton consonants in terms of length and articulatory properties. The research methodology involves acoustic analysis and articulatory descriptions to measure how well English speakers perform in correctly producing these phonetic elements. The participants' proficiency in geminate production varies with linguistic background, exposure, and practice, resulting in a spectrum of proficiency that is reported in the findings. This research is not only a contribution to the area of psycholinguistics by providing insights into cross-linguistic phonetic learning but also provides practical implications for language teaching and learning, recommending targeted approaches for the improvement of Arabic geminate pronunciation by English learners.

Additionally, a number of papers have concentrated on the traditional and/or written form of speech, excluding a great deal around spoken Arabic, and specifically, that of a dialectal nature (Al-Tamimi & Khattab, 2013; El-Jaroudi, 2008). Indeed, this difference is critical considering that vowels can be produced differently under different dialects. There is already a lot that has been revealed in the literature about Arabic vowels, like their length, quality, and coarticulation (Alghamdi & Lee, 2017). However, research has mainly concentrated on formal or written Arabic.

The current study contributes significantly to the topic by broadening the analysis of Arabic vowels. It aims to explore the production of vowels across various dialects and speaker types, thereby enhancing the understanding of the Arabic vowel system. Additionally, the study addresses and rectifies longstanding misconceptions, challenges and revises outdated classifications of Arabic vowels. This work not only aims to clarify the complex nature of vowel articulation within the Arabic language but also to update and refine the phonetic and phonological knowledge based on contemporary linguistic evidence.

Methodology

Research Design

A descriptive-analytic research design, informed by extensive preliminary research in the field, was used in this study. Creswell (2014) recommends the use of research frameworks and methodologies, of which descriptive analysis is a critical element. Babbie

(2020) underlines the centrality of descriptive statistical analysis in the decoding of social data, uncovering the foundational insights that underlie social phenomena. Coolidge (2020) lays out statistical concepts and explains the practical value of getting descriptive statistics accomplished as an initial step of data analysis. Bowling (2014) describes its usage in health research, arguing that it helps to expose health trends. Finally, Yin (2018) follows this line of argumentation to make it clear that descriptive analysis in case study research is the essential context building that makes findings clear. These significant works provide the versatility of descriptive analysis as a research tool, and justify the initial research efforts that laid the foundation for a deeper qualitative and quantitative analysis.

Sampling

Religious texts, in particular Quranic verses, were utilized as primary sources of this study. Their random selection, a method recommended by Creswell and Creswell (2017), guarantees a representative, bias-free extraction of the verses, thus making it possible for them to embody a wide sample of the vowel sounds needed for the purpose of this research, not only to do justice to the exploration of the unique vowel sounds of Quranic Standard Arabic but also to reflect the phonological intricacies of the Arabic language. This befitted the objective of this linguistic study: to explore the subtle variations in the pronunciation of Arabic vowels and to do so with phonetic analysis that is enriched with culturally and religiously significant material.

On another front, the stratified sampling of conversational segments from across the Arabic-speaking geographical landscape (Bryman, 2016) constituted a control for examining not only Modern Standard Arabic but also its regional, geographic, and even subcultural variations. Such an empirical duality not only ensures that the phonetic analysis captures vast nuances and shades of vowel pronunciation across different religious and secular contexts, but it also makes certain that the technique meets the suggested best practice of combining methodologies in linguistic research, which is to delineate the features of the target phonological inventory with loci of use (Teddlie & Yu, 2007).

This method thus not only ensures a detailed analysis of the linguistic peculiarities of the Arabic vowel system but also embeds the analytical framework within a richer, broader cultural context. It is not simply that the religious texts enter the analysis as a matter of method, however, but that they do so as an expression of the depth and complexity of the Arabic language across its numerous domains of use.

Data Collection

All the Quranic verses, for sake of using Standard Arabic component, were retrieved from an authoritative edition (<https://quran.ksu.edu.sa/>). However, this edition with audios was first prioritized, which is consistent with the recommendations by Creswell (2014) regarding the sourcing of religious and historical texts. Conversely, for the conversational clips, data were amassed from a triad of sources, including reliable archived interviews and documents in public domain, following practices as recommended by Berg and Lune (2001).

Data Analysis

Specialized software like Praat and Audacity decomposed various features of vowels,

for example, quality, duration, and coarticulatory phenomena for the case of acoustic analysis. This approach complies with methods proposed by [Boersma and Weenink \(2001\)](#) for linguistic investigation, whereby computer-aided acoustic phonetics was employed. Manual phonetic transcriptions of select samples from each corpus were done to fine-tune the vowel inventory.

This research systematically analyzed the vowel usage of Quranic Arabic, conversational Arabic, and its different dialects through a descriptive analysis model. This method, which was based on phonetic and linguistic analysis principles, was supplemented by the usage of special software tools. This approach is consistent with the development of phonetic analysis technologies ranging from traditional practices to advanced software-assisted methods, as argued by [Loakes \(2013\)](#). After that, the investigation adopted the procedures of automatic speech rate and syllable detection, as described by [De Jong and Wempe \(2009\)](#). Lastly, the methodological approach was also supported by [Beňuš \(2021\)](#), providing a practical guide to phonetics and phonology using Praat. By bringing together these well-established methodologies, the study was able to provide a detailed and in-depth insight into the phonetic patterns in Arabic linguistics.

[Creswell \(2014\)](#) methodologies in the field of descriptive analysis, in particular, have always put emphasis on the sourcing of sacred and historical texts with great depth and comprehensiveness. The characteristic elements of his qualitative framework, as featured in his works, recommend critical source analysis, detailed understanding of the context, and consistency in the methods. In descriptive analysis research, it entails a scrupulous analysis of authenticity and relevancy of texts, disclosing historical and cultural contexts, and guaranteeing that the research design is in line with the study's aims and theoretical foundation. Creswell does not lack reminding us of ethical considerations and the integration of various viewpoints, in particular, when it comes to culturally and religiously significant sources. This entails an all-around and considerate treatment of sources so that the multi-dimensionality and intricacy that qualitative research naturally carries are reproduced. This is also guided by the principles of qualitative data analysis as stated by [Saldaña \(2021\)](#), and a mixed method research analysis stated by [Tashakkori and Teddlie \(2002\)](#).

Finally, a broad-ranging comparative assessment was performed by comparing the vowel inventories of Quranic Standard Arabic with some selected spoken dialects. The acoustic, phonetic, and statistical analyses offered their own understandings of Arabic vowels, with this report giving a multilayered comprehension, which incorporates these individual findings into an integrative framework. This multi-faceted approach was intended to address the gaps in the research literature on Arabic phonology while making a substantial contribution to the academic discourse.

Results

Short vowels, as shown in [Table 1](#), play an important role in the structuring of the inflectional pattern of the language and in its semantics. These vowels can be frequently represented by diacritical symbols in the Arabic script and may sometimes substantially change the meaning of a word. A succinct elaboration of these vowels is as follows:

Table 1*Short Vowels: Vowels that are Short in Duration.*

Vowels	Duration in Seconds	Description	Arabic QA = Quranic, MA = Modern Arabic	Meanings
/ɪ/	0.063129	Near-close, near-front unrounded vowel	bɪsmɪ'læhɪ	In the name of God
/e/	0.145125	Close-mid front unrounded vowel	əl'ʔælemɪ:n	People of the world
/æ/	0.307664	Near-open front unrounded vowel	bɪsmɪ'læhɪ	In the name of God
/ʌ/	0.102517	Mid-open back unrounded vowel	ər'rʌhmæn	The gracious
ö	0.244082	Near-close near-back rounded <i>Shorter vowel</i>	'rʌb,bö	Lord
/ʊ/	0.179501	Near-close near-back rounded vowel	'hʊdən	guidance
/ɒ/		Open-back rounded vowel	---	---
/ə/	0.084150	Mid-central vowel	əl'hʌmdʊ lɪl'læhɪ	Praise be to God

1. /ɪ/: Manifested in the term 'bɪsmɪ'læhɪ,' which signifies 'In the name of God,' this near-close, near-front unrounded vowel is ubiquitous in both religious and quotidian parlance, fulfilling a dual role in lexico-prosodic constructions.
2. /e/: This close-mid front unrounded vowel, instantiated in 'əl'ʔælemɪ:n' – equivalent to 'People of the world' – is a prevalent element in Arabic's phonemic inventory, enriching its phonological diversity.
3. /æ/: Occurring also in 'bɪsmɪ'læhɪ,' this near-open front unrounded vowel, when juxtaposed with /ɪ/, epitomizes the intricate system of Arabic vocalism wherein nuanced articulatory variations engender semantic divergences.
4. /ʌ/: Present in 'ər'rʌhmæn,' translating to 'The gracious,' this mid-open back unrounded vowel is often salient in religious lexicon, imbuing specific phrases with semantic inflections.
5. ö: Found in 'rʌb,bö,' or 'Lord,' this near-close, near-back rounded vowel of reduced duration potentially implies either a syllabic de-emphasis or particular phonotactic requisites in lexical structuring.
6. /ʊ/: Encountered in 'hʊdən,' meaning 'guidance,' this vowel, although phonologically akin to ö, is differentiated by its standard duration, thus rendering distinct contributions to the word's syllabic composition.
7. /ɒ/: While absent of an illustrative example, this vowel presumably occupies a specific niche within the Arabic phonological framework, potentially effecting contrasts with other vowels or existing in lexemes particular to either Quranic or Modern Arabic.
8. /ə/: Demonstrated in 'əl'hʌmdʊ lɪl'læhɪ,' or 'Praise be to God,' this mid-central vowel, due to its phonological neutrality, frequently serves as an integrative element within disparate phonetic constellations.

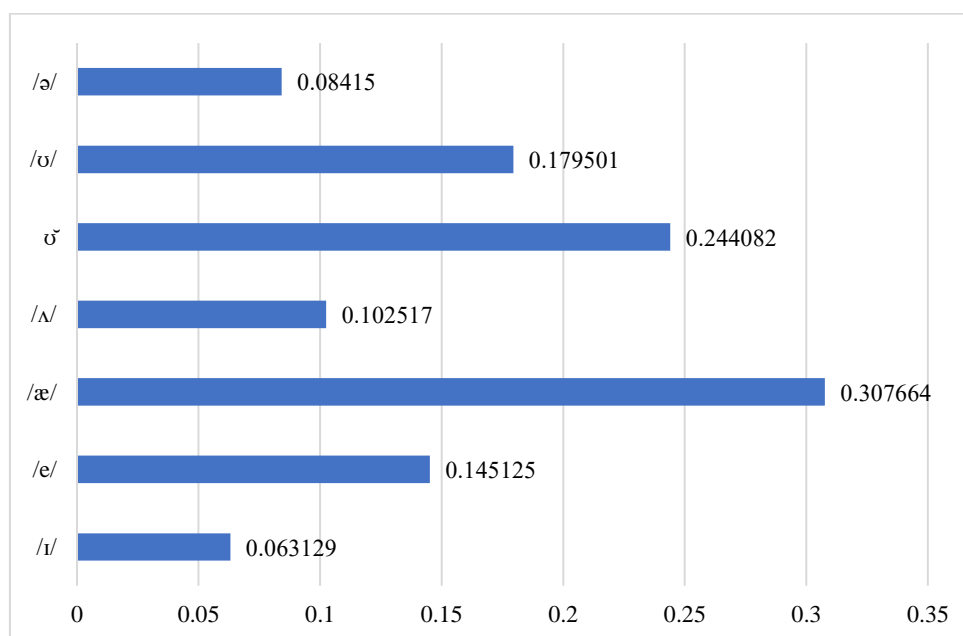


Figure 1: Short Vowels Duration in Seconds.

Figure 1 classifies vowels based on their duration in seconds, The complexity of such little sound marks provides for numerous semantic as well as phonic contrasts within Arabic. Considering that they are brief in terms of phonic period, people fail to understand the message they convey at the initial stages of development of morpheme-semantics of the language. In the future, possibly combining phonological analysis with corpus-based methodologies may throw more light on these complex vocalic aspects.

Table 2

Long Vowels: Vowels that are Relatively Long in Duration.

Vowels	Duration in seconds	Description	Arabic QA = Quranic, MA = Modern Arabic	Meanings
/i:/	0.544669	Close-front unrounded vowel	ər' rʌhmī:m	The merciful
/ɑ:/	0.395594	Open-back unrounded vowel	sɪ' rɑ:t'ʔəl, lə' dɪ:nə	The path of those ...
/ɔ̃/	0.256281	Close back rounded <i>shorter</i> vowel	'kʌfə, rɔ̃	disbelieved
/u:/	0.469433	Close back rounded vowel	məy' d'ʊ:bɪ	evoked anger
/ɜ:/		Open-mid central unrounded vowel	---	---

Table 2 demonstrates how long vowels play a role in both Quranic Arabic (QA) and Modern Standard Arabic (MSA), showing off their articulatory features on one hand and being very rich in meaning on the other hand. In unique ways, these vowels add to the phonetic richness of the Arabic language. A concise scholarly analysis of these long vowels follows:

1. /i:/: Manifest as a close-front unrounded vowel in the lexeme 'ər'rʌhmī:m,' which conveys 'The merciful,' this long vowel enriches the morphological intricacy of Arabic. It is often implicated in imbuing lexical items with specific semantic overtones – such as emphasis or divine attributes in the present case.
2. /a:/: Characterized as an open-back unrounded vowel, this phoneme features in 'sī'rɑ:tʃəl,lə'di:nə,' denoting 'The path of those...' It probably plays a salient role in prosodic and intonational elements, notably in ecclesiastical contexts where prosody and cadence bear considerable import.
3. /u:/: Exhibited as a close back rounded vowel of 'diminished' duration in 'kʌfə,rū,' translating to 'disbelieved,' the brevity of this vowel may denote a subordinated stress pattern, thereby influencing the lexeme's overall tonal quality.
4. /u:/: Represented as a close back rounded vowel in 'məy'dʕu:bi,' which corresponds to 'evoked anger,' the long vowel could serve as a vehicle for the amplification of semantic gravity or intensification in both Modern and Quranic Arabic.
5. /ɜ:/: Absent an illustrative exemplar, this mid-central vowel's presence in the phonological catalog suggests a probable specialized function. Given its articulatory centrality, it might act to acoustically equilibrate the phonemic range of Arabic vowels.

Figure 2 presents the duration of these long vowels in seconds.

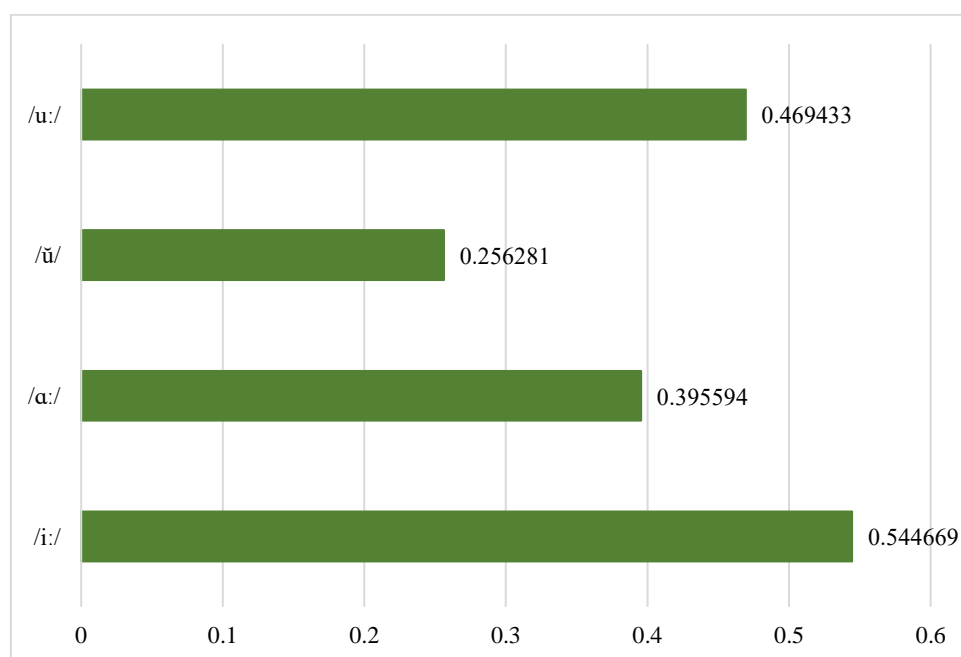


Figure 2: Long Vowels Duration in Seconds.

In sum, these long vowels play a multitude of roles in the lexico-semantics as well as the morpho-syntax of Arabic, apart from just duration. The functions may demarcate disambiguation, mood, or complex syntactical association. Adopting a hybrid investigative approach that combines sound examination and corpus-based linguistics can expose more functions of these long vowels within the Arabic linguistic landscape.

Table 3*Diphthongs: A Combination of Two Short Vowels.*

Vowels	Duration in seconds	Description	Arabic QA = Quranic, MA = Modern Arabic	Meanings
/æɪ/	0.976327	near-open front closing diphthong	lɪ'æɪ.jætɪnə ʒæɪ	toward our verses trumpet, coming
/aɪ/	0.416500	Open front-closing diphthong	(MA) raɪ	opinion
/aʊ/	0.870204	Open back-closing diphthong	'ɣaʊ, wu:n	deviators
/eɪ/	0.239728	Close-mid front central-closing diphthong	ə'leɪɦɪm	upon them
/əʊ/	0.410476	central back-closing short diphthong	əʃ'tərəʊ	purchased
/əʊ/	0.354785	central back-closing diphthong	ħəʊ'ləhə, 'təʃθəʊ	around him, commit abuse
/ɪʊ/	0.498345	near-close, back-closing diphthong	yəstəh'zɪʊ	mocks
/ɔɪ/		Open mid-back closing diphthong	---	---
/ɪə/	0.628727	near-close, centering diphthong	nɪʔs'mətə	My favor
/eə/	0.497029	close-mid-front centering diphthong	xəər	better
/ʊə/	0.462517	near-close near-back centering diphthong	'hʊ.zʊə	in jest

Table 3 presents the taxonomic arrangement of diphthongs in both Quranic Arabic (QA) and Modern Standard Arabic (MSA), elucidating the intricacies inherent in the phonological architecture of the Arabic vowel spectrum. An academic interrogation of these diphthongs implicates diverse facets, specifically: articulatory traits, semantic profundity, and dialectal particularities. A concise scholarly exposition follows:

1. /æɪ/: This near-open front-closing diphthong, prominent in MA, is typified in lexemes such as 'toward our verses' and 'coming.' The prevalence and distribution of this diphthong could furnish valuable data on contemporary phonological evolutions.
2. /aɪ/: An open front-closing diphthong manifest in MA, this occurs in the lexical item 'rai,' denoting 'opinion.' Sociolinguistic dimensions, including the discursive contexts in which 'opinions' are predominantly articulated, could bear relevance.
3. /aʊ/: Featured in the term ''ɣaʊ, wu:m,' translating to 'deviators,' this open back-closing diphthong's articulatory properties may be intrinsically linked to its semantic ramifications, meriting phonetic scrutiny.
4. /eɪ/: This close-mid front central-closing diphthong, present in 'ə'leɪɦɪm' ('upon them'), prompts questions pertaining to its role in stress and emphasis within Arabic, thereby necessitating further analysis.
5. /əʊ/: As a central back-closing short diphthong, this is encountered in 'əʃ'tərəʊ,' meaning 'purchased.' Its truncated duration could have both phonetic salience and

semantic implications.

6. /əʊ/: Encountered in lexical items like 'həʊ'ləhə' ('around him') and 'təʔθəʊ' ('commit abuse'), this central back-closing diphthong exhibits semantic malleability, thus suggesting its phonological significance.
7. /ɪʊ/: A near-close back-closing diphthong, as found in 'yəstəh'zɪʊ' ('mocks'), could have phonetic corollaries that relate to connotations of derision or disparagement.
8. /ɪə/: Observed in 'nɪʔ'mətɪə' ('My favor'), this near-close centering diphthong might have implications for syllabic stress or lexical emphasis.
9. /eə/: This close-mid-front centering diphthong, found in 'xəə' ('better'), may convey evaluative semantic aspects tied to judgments of quality.
10. /ʊə/: In 'hʊ'zʊə' ('in jest'), this near-close near-back centering diphthong could contribute to the lexical item's tonal or register-specific nuances, potentially shaped by sociolinguistic variables.

Figure 3 illustrates the diphthongs duration in seconds.

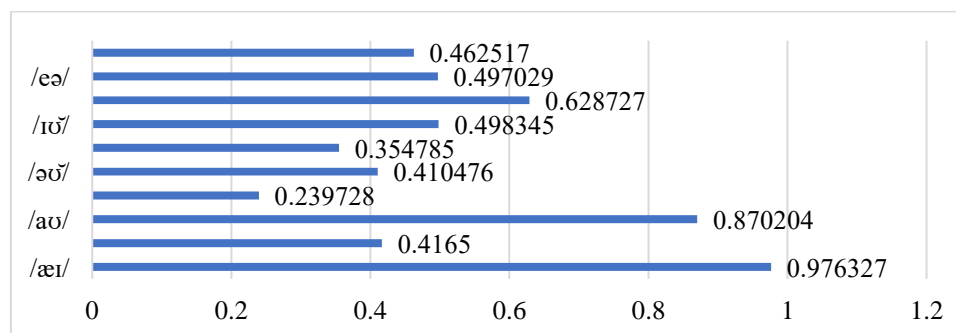


Figure 3: Diphthongs Duration in Seconds.

The multi-layered complexities of these diphthongs constitute fertile territory for scholarly investigation, intersecting with phonological, morphological, and sociolinguistic paradigms. An integrative methodology, incorporating both acoustic assessments and statistical evaluations, promises a richer analytical yield.

Table 4

Triphthongs: A Combination of a Diphthong and a Schwa.

Vowels	Duration in seconds	Description	Arabic QA = Quranic, MA = Modern Arabic	Meanings
/aɪə/	1.128798	diph + a schwa	اىء, ho' dae	verse, my guidance
/eɪə/	0.997528	diph + a schwa	ka' seɪəbɪn, ju' beɪən	rainstorm, clarify
/aʊə/	0.954354	diph + a schwa	tə' haʊəɾəkʊmə (MA) 'xəʊəðə, 'daʊə	your dialogue avoided, cured
/ɔɪə/	0.272875	diph + a schwa	(MA) məɪəh, 'bɔɪəh	water, paint

Table 4 presents the description and meaning of triphthongs, which are vocalic sequences consisting of a diphthong followed by a schwa, and which have been incorporated into Quranic Arabic (QA) and Modern Standard Arabic (MSA), illustrating that modern dialects have more complicated phonologies. The coalescence of these agglomerations of vowels creates not only structural complexities but also encourages thoughts on whether such elements are

linguistically necessary or have meaningful symbolic meaning.

Below is a brief enumeration of pertinent instances:

1. /aɪə/: This triphthong materializes in expressions like "aɪəh," denoting 'verse' in QA, and "hə'daɪə," signifying 'my guidance.' The terminal schwa may serve as a transitional articulatory component, facilitating phonetic continuity to ensuing elements.
2. /eɪə/: Manifest in lexemes such as "kə'seɪəbɪn" and "jə'beɪəh," which respectively signify 'rainstorm' and 'to clarify,' this triphthong suggests that its terminal schwa possibly possesses articulatory relevance, necessitating additional phonological scrutiny.
3. /aʊə/: Exemplified in constructs like "tə'həʊəɾəkʊmə," "xəʊəðə," and "dəʊə," translating to 'your dialogue,' 'avoided,' and 'cured,' the schwa likely performs an articulatory role while its impact on morphological architecture invites further exploration.
4. /ɔɪə/: Predominantly found in MA, this triphthong emerges in "məɪəh," referring to 'water.' Similar to its counterparts, it presents questions of both articulatory and potential morphological significance that warrant targeted evaluation.

Figure 4 illustrates duration of triphthongs in seconds

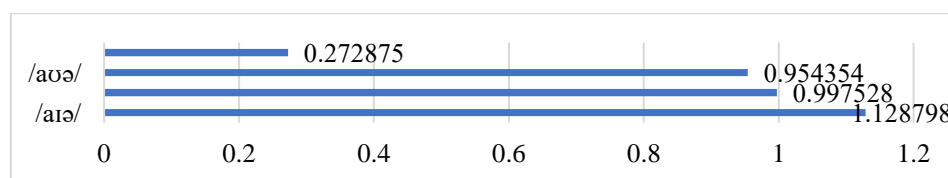


Figure 4: Triphthongs Duration in Seconds.

The analysis of vowel duration in Arabic, categorizing into short vowels, long vowels, diphthongs, and triphthongs with measured times, highlights the language's phonetic richness and sets the stage for exploring vowel length. Short vowels, lasting between approximately 0.063 to 0.307 seconds, occur in unstressed syllables or common words, essential for Arabic's rhythm and efficient communication. Long vowels, exceeding short ones in duration, significantly influence meaning and speech tone, indicating their qualitative impact. Diphthongs and triphthongs, with longer durations due to their complex articulation, illustrate Arabic's dynamic pronunciation (Newman, 2002). Vowel length's role transcends speech mechanics, touching on language learning, perception, and identity, making its mastery crucial for proficiency in Arabic. This study of vowel length reveals the language's depth, adaptability, and the critical role of timing in phonetics.

Based on these observations, an empirical approach can be taken to examine acoustic corpus data which may supplement our understanding of the phonological effects of these triphthongs. With cross-linguistic juxtapositions, it is possible to ascertain if such vocalic phenomena are specific to Arabic or can be found in other linguistic situations, which would yield greater phonological information. The above-mentioned triphthongs play the role of articulator, morphologist, and possibly even semanticist for both Quranic Arabic (QA) and Modern Standard Arabic (MSA); hence, they should be subjected to further investigation.

Discussion

The study findings make it evident that, as one looks at any text, one starts to believe

that Arabic has only six vowel sounds. The argument raised in this study challenges the notions that were earlier supported by works such as those by [Al-Khatib \(2006\)](#) and [Bahloul \(2004\)](#). For instance, both Quranic Arabic (QA) and Modern Standard Arabic (MSA) demonstrate eight kinds of short vowels as well as five long ones and a set of diphthongs and triphthongs. This implies that these vowels do not only exhibit varied spectral features but also carry specific functions within the semantic and morphologic structures. This vowel inventory is thus very complex and sophisticated to support the simple claim that Arabic has hardly any vowel sounds – only six vowel sounds.

The findings from some previous studies, like [Bahloul \(2004\)](#) and [Owens \(1988\)](#), which suggested that MSA has a limited set of vowels, are in a way proved wrong because MSA is known to have a wide set of vowels. Previous research is limited as they focused on some aspects of phonemes like quality and quantity, while the present study outlines the complex vowel system of MSA. The study discussed not only short sounding vowels like /ɪ/, /e/, /æ/, /ʌ/, /ɔ̃/, and /o/, but also long sounding vowels such as /i:/, /a:/, /ū:/, and /u:/. The extent of this stock is further enhanced with the inclusion of trisyllabic vowels such as /aɪə/, /eɪə/, /aʊə/, and /ɔɪə/. The study thus helps not only to see the whole picture of Arabic's multi-dimensional phonology, but it also reveals how these vowels contribute to the meaning and the morphology in Arabic.

There is a large difference between the scope of the present research and that of previous studies about the Arabic vowel system because the former reveals more complex phonetics. It has been presumed that Arabic consists of only six vowels until now. It has challenged the popular beliefs, thus making Arabic interesting for research in matters such as phonology, morphology, and sociolinguistics. This demonstrates that there is a need to take a wider view in undertaking a generalized study. Future research should embrace an inclusive model encompassing phonological analysis and corpus-based research. This dual approach helps in attaining a better perception of the intricacies in the Arabic system of vowels. This viewpoint enlarges knowledge about Arabic phonetics and, at the same time, allows more ways for linguistic and cultural research.

Conclusion

This study considerably develops and complicates the common perception of the vowels in the Arabic language, rejecting the most widespread version based on only six vowels – the one that received support from a great number of classical philologists, including [Al-Khatib \(2006\)](#). Unlike previous studies that identified only three short and three long vowels, the current work found a rather elaborate vowel inventory comprising eight short vowels, five long vowels, and many diphthongs and triphthongs. This study also examines how these vowels are important in the semantics and morphology of Modern Standard Arabic.

This study diverges from the constricted views provided by other studies. Rather, it opens up the realm of linguistics in which these vowels exist, thereby contributing to both phonological and morpho-semantic knowledge within the language. In addition, since the present study exposes how the Arabic vowel system becomes diversified, it can also be regarded as providing a contribution towards demanding more sophisticated empirical methodologies in future studies. In particular, future research directions should include using multi-faceted approaches that combine rigorous phonological analysis with corpus-based methodologies to better break down and understand the multifarious complexities

of the Arabic vowel system. Such an integrative approach would provide a greater understanding of the phonology of Arabic and its entire linguistic interplay.

Implications and Recommendations

The implications of recognizing Arabic's intricate vowel system are manifold, extending into various domains of linguistic study, pedagogy, and computational analysis.

1. **Linguistic Theory:** Simplistic phonological models do not account for the subtleties in vocalic elements associated with the complexity of Arabic's vowel inventory. Such understanding might call for reshaping some phonological theories, especially those addressing Semitic languages.
2. **Language Learning and Pedagogy:** This may have implications for learning and teaching language for Arab learners and their trainers. Leaving the complexities of the vowel system out of the curriculum may result in spreading defective or inaccurate knowledge about the acoustic properties of Arabic, which is likely to undermine the effectiveness of language learning approaches.
3. **Natural Language Processing (NLP):** Understanding of Arabic vocalic architecture should be used in computer tools applied within Arabic language treatment as well. Machine translation, speech recognition, and other NLP applications may become faulty due to ill-founded presumptions concerning vowels' simplicity.
4. **Comparative Linguistics:** It may be possible to provide comparative details about Arabs' vocalic system with regard to the phonological system of other languages. This is especially so with languages like Arabic that have complex inventories of vowels whose juxtaposition may be informative.
5. **Morphological and Semantic Analysis:** Accordingly, this study reveals vowels as being highly meaningful in terms of both morphology and meaning. The complexity may cause problems with interpreting Arabic texts, both old and new, requiring more sophisticated techniques for morphological and semantic analyses.
6. **Sociolinguistic Considerations:** Studying the complex articulatory systems of all the vowels involved would help us understand how they are used to denote sociolinguistic markers such as register, regional dialect, and other similar variations in social languages.
7. **Orthographic Implications:** The re-appraisal and the new perception of the diacritics will significantly influence Arabic pedagogical practices and the choice of an appropriate and suitable typeface.
8. **Future Research:** As a way forward, future research needs to adopt an integrative approach merging acoustic tests and corpus-linguistic studies, which would yield better results. It thus gives ground for interdisciplinary practice that would further link phonology theory with applied linguistics.

Generally speaking, the complete inspection of vocalic features in Arabic requires a holistic view of the language as a complex and multi-dimensional phenomenon that deals with several aspects of the language. It thus challenges scholars and practitioners alike to think harder and go beyond a simplistic view of Arabic phonology that largely takes into account its consonantal parts.

In view of the interconnected ramifications and implications that have been expounded on, future researchers should pay attention to a few vital issues that would serve to aid the

current work. The initial step is to have curricula for schools that offer Arabic language courses, which would be more detailed in exploring the Arabic vowel system, and in catechism resources, there should be an integration of culture and ethnic diversity. Besides, focusing on practicing educators in phonics for Arabic is also very important, highlighting the value of training that is updated regularly with the latest developments. The creation of a comprehensive set of phonemes, annotated with the Arabic vowel symbols, as well as helping account for any regional and environmental variations, will be of utmost importance in terms of helping researchers and developers of language technologies.

In addition, developing elaborated natural language processing algorithms to perfectly reflect the finesse of Arabic vowels needs to put in place the conjunction of linguistics and technology. Interdisciplinary interactions among scholars, linguists, computer specialists, and sociolinguists should be encouraged in order to holistically study the knowledge of the Arabic vowel system. Arabic linguistic research against other Semitic, as well as non-Semitic languages, may reveal fresh knowledge on phonology and structure. Finally, sociological research focusing on the effects that region, as well as age and social groups, have on the Arabic vowel system should be performed to give a detailed account of linguistic diversity. Such regions will most likely be the future subject of such investigations, paving the way to make impressive progress in the field of phonetics and phonology, fulfilling a significant part of linguistic studies, language teaching, and cultural understanding.

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