

The Phonology of nasal n in the Language of the Holy Qur'an

by

Shadiya Adam al-Hashmi
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University of Victoria

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* Dr. Ewa Czaykowska-Higgins (Department of Linguistics) supervised the writing of this thesis. Due to personal circumstance, she is unable to attend the oral defence and to sign the cover sheet.

Supervisor: John H. Esling, Department of Linguistics

ABSTRACT

Tajwīd (Tajweed) – the tradition of the Holy Qur’an’s recitation – is composed of about twenty-eight phonological patterns, which have an underlying semantic/pragmatic meaning of *sacredness*. Nasal n assimilation patterns of ‘idghām (*gemination with & without nasalization*), ‘ikhfā’ (*nasal place assimilation*), ‘iqlāb (*labial place assimilation*) and ‘idhhār (*zero nasal assimilation*) are taken as representative of *Tajwīd* in this work.

The central theme of this thesis is two fold. First, the twenty-eight sounds of the language of the Holy Qur’an (LHQ) as used in the four patterns of nasal n assimilation are distributed among the three natural sound classes of sonorants, obstruents and gutturals, the latter of which crosscuts the other two.

Second, the realization of the meaning of *sacredness* in the LHQ is best accounted for by Kurisu’s (2001) Realize Morpheme Theory set in Optimality Theory (Prince and Smolensky 1993). Kurisu’s (2001) Realize Morpheme constraint is expanded herein to encompass a variety of meanings; i.e., morphosyntactic and non-morphosyntactic. Like Kurisu (2001), I contend that faith is relativized to the meaning expressed in that each pattern is determined by ranking a particular faithfulness constraint in relation to RM. However, the meaning expressed in the LHQ is non-morphosyntactic.

This thesis is organized as follows. Chapter one introduces the reader to the Language of the Holy Qur’an through describing its genetic affiliation and geographical location in addition to past research done on it and the theoretical assumption adopted. Chapter two describes each pattern/process of nasal n in the LHQ, whereas chapter three

explores how the LHQ sounds are grouped into natural sound classes. Finally, chapter four analyses nasal n patterns in the LHQ using Kurisu's (2001) Theory of Realize Morpheme set in Optimality Theory.

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Abbreviations

The following abbreviations are used throughout this thesis. Some are related to the glossing of the Language of the Holy Qur'an and Arabic while others to the framework used; i.e., Optimality Theory and Realize Morpheme Theory.

Symbols of the Language used

LHQ	Language of the Holy Qur'an
MSA	Modern Standard Arabic
CA	Classical Arabic
'	zammah (Tanwīn diacritic for the nominative case)
'	fathah (Tanwīn diacritic for the agentive case)
'	Kasrah (Tanwīn diacritic for the jussive case)
PBUH	Peace Be Upon Him
HCP	High Classical Pronunciation
CARS	Classical Arabic Reading Style
SA	Sudanese Arabic

Linguistic symbols

~	Nasalization
E	Extrametrical
OT	Optimality Theory
RM	Realize Morpheme
T	Tajwīd
H, L	High variety, low variety
HH	Higher than the high
UG	Universal Grammar
Phary.	Pharyngeal
Son.	Sonorant
Obs.	Obstruent
EDH	Etymological Dictionary of Harari
OCP	Obligatory Contour Principle
Nas.	Nasal
Max.	Maximize
Ident	Identity
I-O	Input-Output
O-O	Output-Output
Gem.	Geminate

Transliterations

The following is the traditional transliteration system as used in the thesis for transliterating Arabic script into Roman characters.

Consonants

Arabic script	Letter	Arabic name	Comments
أ	ʾ	ʾalif	Arabic hamzah: a glottal stop [ʔ] which at the beginning of a word may not be transliterated but is implied in the vowel that follows it. In any other position it is transliterated as ʾ.
ع	ʿ	ʿayn	Voiced pharyngeal approximant [ʕ]
ب	b	bā	[b]
د	d	dāl	[d]
ذ	dh	dhāl	[ð]
ض	ḍ	ḍād	Uvularized [d ^ʁ]
ف	f	fā	[f]
غ	gh	ghayn	Voiced fricative [ɣ]
ه	h	hā	[h]
ح	ḥ	ḥā	Voiceless pharyngeal fricative [ħ]
ج	j	jīm	[dʒ]
ك	K	khāf	[k]
خ	Kh	khā	Voiceless uvular fricative [χ]
ل	l	lām	[l]
ل	ḷ	lām	Pharyngealized [l ^ʁ]; only in the word ʾalī ah
م	m	mīm	[m]
ن	n	nūn	[n]
ق	q	qāf	[q]
ر	r	rā	[r] or [ɾ]
س	s	sīn	[s]
ش	sh	shīn	[ʃ]
ص	ṣ	ṣād	Uvularized [t ^ʁ]

ت	t	tā	[t]
ث	th	thā	[θ]
ط	ṭ	ṭā	Uvularized [t ^ʰ]
و	w	wā	[w]
ي	y	yā	[j]
ز	z	zayn	[z]
ظ	ẓ	ẓā	Uvularized [ð ^ʰ]

Vowels and diphthongs

ا	a	fathah	/a/
إ	i	kasrah	/i/
أ	u	ḍammah	/u/
آ	ā	'alif mamdūdah	/a:/
ى	á	'alif maqṣūrah	/ə/
ي	ī	yā	/i:/
و	ū	waw	/u:/
	aw		/aw/
	ay		/ai/

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Dedication

I dedicate this thesis to every
Muslim around the world and to my beloved family

Quotation

In the name of Allah,
Most Gracious Most Merciful

'alladhīna 'ātaynāhum 'alkitāba yatlūnahu ḥaqqā tilāwatih

[Those whom we have given the Book (Qur'an) recite it as it
should be recited] (II: 121) (Ali 2001)

The Phonology of nasal n in the Language of the Holy Qur'an

Chapter 1

An Introduction to the Arabic of the Holy Qur'an

1.1 Introduction

The Language of the Holy Qur'an (LHQ, henceforth) is governed by a tradition of recitation or cantillation known as *Tajwīd*. In its essence, *Tajwīd* comprises a set of phonological rules regulating how the Holy Book should be recited. Among the twenty-eight or so different processes/patterns of *Tajwīd*, those of non-syllabic nasal n (*nūn sākinah*) are taken as the focus of the present work. In three of these patterns, nasal n is caused to assimilate whereas in the fourth one it remains unchanged. The first three are known as *'idghām* (*gemination*), *'ikhfā'* (*nasal place assimilation*) and *'iqlāb* (*labial place assimilation*) while the fourth is *'izhār* (*zero nasal assimilation*).

Nasal assimilation in the LHQ ranges from *gemination with or without concomitant nasalization* to *nasal place assimilation*. In Arabic, *gemination* literally means assimilation (*'idghām*). Hence, nasal n assimilates to the place and manner of a following sonorant forming a geminate with it and nasalizing semivowels if the following sonorant is a semivowel (glide; /w/ or /j/) as in (/man#jaqu:l/→mΛj_ jaqu:l). Vowels are also nasalized if nasal n is followed by either of the two Arabic nasals (/m/ or /n/¹) as in (/min naḏi:r/→mĩn naḏi:r). Gemination of semivowels and nasals is labelled as *'idghām juz'ī* (*partial assimilation*) whereas *'idghām Kullī* (*total/complete*

¹ The velar nasal /ŋ/ is not a phoneme in Arabic or in the LHQ.

assimilation) happens when doubling of consonants without nasalization occurs, such as when the *n* is followed by a liquid (/l/ or /r/) (*min rabbih* → *mir rabbih*).

In the two processes of '*ikhfā*' (to hide or conceal (the *n*)) and '*iqḷāb*' ; (turning (an *n* into an *m*)), nasal *n* assimilates to the place of a following obstruent. In '*ikhfā*', nasal *n* is replaced by an allophone which is similar in place to a following obstruent (*ḏillan ḏali:la* → *ḏillān ḏali:lə*). Similarly, in '*iqḷāb*', nasal *n* is replaced by the other nasal of Arabic /m/ when followed by the voiced bilabial stop /b/ (/junbit/ → *jūmbit*). The preceding vowel of nasal *n* is nasalized in '*ikhfā*' and '*iqḷāb*'. There is no assimilation of nasal *n* in the LHQ when nasal *n* is followed by one of the six gutturals (/χ/, /ʕ/, /ħ/, /ʁ/, /h/ and /ʔ/). This is called '*izhār*' (retaining the *n* and pronouncing gutturals without nasalization) which is exemplified by (/man#ʔaʔta/ → *man ʔaʔtə*).

These four patterns (since '*izhār*' is not a process) along with all the other *Tajwīd* phenomena have a dual function. First, they express the meaning of *sacredness* of the Holy Qur'an. This is due to the belief Muslims hold that the Qur'an recited with *Tajwīd* is the very words spoken by God, revealed to Mohamed (PBUH) through Gibrael/Gabriel. A second related sub-function relates to the social use of Qur'anic recitation, since *Tajwīd* triggers register shift from the register of classical or modern Arabic (e.g., *ʔanbiʔhum*) to a higher divine religious register (*ʔāmbiʔhum*). It is this particular mode of reading the Holy Book applying *Tajwīd* rules that Muslims believe the Lord commanded them to use when reciting the Holy Book or when performing prayers in "chant the recitation in measured, clear chant" (wa-rattil al-qur'an^a tartil^{an})

(ورث القرآن ترتيلا). We can perceive this sub-type of *register shift* to be connected to the meaning of *sacredness* in that the higher register of the Holy Qur'an is more sacred and eloquent than classical or modern Arabic. To put it differently, *sacredness* could be viewed as an abstract meaning which is achieved by triggering *register shift* which in turn is triggered by the application of the different patterns/processes of *Tajwīd*.

Thus, what this thesis strives to answer is two major questions. First, how could the meaning that the particular phonological patterns attributed to the Arabic of the Holy Qur'an be expressed in a grammar (theoretical framework)? And, what do the LHQ nasal n patterns tell us about natural sound classes?

My answer to the first question comes from Kurisu's (2001) Theory of Realize Morpheme set in Optimality Theory (Prince and Smolensky 1993). I argue that the special meaning/s *Tajwīd* (represented by nasal n phenomena) underlyingly has is/are realized as a semantic/pragmatic element in the surface structure. Kurisu's RM constraint is generalized in this thesis as Realize Meaning rather than Realize Morpheme given that the meaning of *sacredness* is not grammatical in nature but is rather semantic/pragmatic.

As to the second question, my examination of the four nasal phenomena in the LHQ sustains the naturalness of the guttural class, in addition to the two classes of sonorants and obstruents. One of the major observations this research makes is that the guttural class crosscuts the other two sound classes.

This introductory chapter is organized as follows. Section 1.1 gives an overview about the Language of the Holy Qur'an (LHQ). Section 1.2 demonstrates the sociolinguistic aspect of the language by tracing its genetic affiliation and geographical location and by comparing it to Modern Standard Arabic (MSA). It also initiates the

reader to the tradition of recitation (*Tajwīd*). Section 1.3 labelled as *Language background* narrates the previous work done on *Tajwīd* and some related aspects to the topic of the thesis. In addition, it tracks the method by which the used data was collected and gives a brief background about the subject of the research.

Section 1.4 examines the basic tenets of the general framework used in this work, namely Optimality Theory (Prince and Smolensky 1993). Within Optimality Theory, the theory of Kurisu's (2001) Realize Morpheme is taken as the specific model (which is slightly modified, however) followed herein. Section 1.5 sketches the basic objectives of "The Phonology of nasal n in the Language of the Holy Qur'an". Finally, section 1.6 summarizes the different issues and facts raised in chapter one.

1.2 LHQ and sociolinguistics

1.2.1 Genetic affiliation and geographical location

Spoken in more than 20 countries in the area of the Middle East of Asia and Africa (see map (1) in appendix (1)), Arabic – a South Eastern Semitic language – has come to be known today as Modern Standard Arabic (MSA) which is a descendant of an earlier Classical Arabic (CA). The highest register of CA is the language of the Holy Qur'an (LHQ) which is the language under study in the current work.

Before the advent of Islam, Arabic was spoken only in the Arabian Peninsula which old geographers like Al'asma'i – as cited in Ar-Rajhi (1969) – describe to include the area from Eden (in Yemen) in the south to Mesopotamia and Syria (A'shaam) in the north, except for those places under the Roman or the Persian rulings, and from Jeddah (in Saudi, today) to Iraq. See map two in appendix (1) for the area of the Arabian Peninsula.

Unfortunately, what we have received about the Arabic spoken before Islam is so limited and vague. For instance, history books disagree about the origin of Arabs. Al Mas'oudi (1283 H) narrates that Arabs descend from *Qahtaan* and *Ma'ad*, while Al-Mubarid (1936) relates them to *Adnan* and *Qahtaan* whereas Ibn Khaldoon (no date) adds *Qudha'ah* to *Adnan* and *Qahtaan*. The second opinion is the one prevailing and assumed in the majority of history books today.

Some of the famous Arab tribes among which Islam spread – as labelled in map (2) in appendix (1) – are *Ghatafan*, *Hawazin*, *Saleem*, *Rabee'ah*, *Hatheel*, *Tameem* and *Quraysh*. The reader could refer to Ar-Rajhi (1969, p. 20-34) for a summary of the Arab tribes before Islam.

1.2.2 Arabic language before Islam

1.2.2.1 Linguistic background about Arabic before Islam

Some linguistic questions are bound to arise when discussing the linguistic situation of Arabic before Islam. For instance, one might wonder about (1) the nature of the Arabic spoken before Islam (whether it was one common language or broken down into different dialects) and (2) how it relates to the LHQ. I have to confess that these are not easy questions to answer satisfactorily since- as a matter of fact- not many references discuss them.

Ar-Rajhi (1969) argues that although the different Arab tribes spoke different dialects of Arabic, they had a common language which they used to converse among themselves and in composing poetry. One piece of evidence he uses is that of “*‘ashīr ‘āhili*” (pre-Islamic poetry) which had distinguishing features and which was used by

different poets from different Arabic tribes. We are told that the best poems were written in gold and hung in the *Ka'abah* in *Makkah*. These were known as *al-Mu'alaqaat*.

A point I would like to mention here and is actually raised in Ar-Rajhi (1969) is that the different dialects that old Arab tribes used were not vernaculars in the same way we use and perceive this terminology today. This is shown in the discussion to come.

1.2.2.2 Mohammed (PBUH)

The prophet Mohammed (PBUH) who is from the tribe of *Quraysh* which inhabited *Makkah* was born about the year 570 A.D. His father Abdullah Ibn Abd Al-Muttalib died before Mohammed's birth and his mother when he was six years old, leaving him to the guardianship of his grandfather Abd Al-Muttalib. When Mohammed was two years old, his grandfather gave him to a wet-nurse called Halima A's'adiya (and known as *Murdhi'at a'rasool*; the foster mother of the messenger) who was from the tribe of *Bani Sa'ad* which lived in the desert.

It was the trend of *Qurayshi* people to send their sons at an early age to the desert, for a number of reasons. One of them was that *Makkah* was a trade point and a center of attraction for people from different places especially during the season of pilgrimage, since the *Ka'abah* was and is located there. Different diseases spread with the flow of the pilgrims, which urged Qurayshis to send their young children away to the desert where it was healthier and fresher. A second reason is linguistic in nature in that Qurayshis wanted their children to acquire a fluent and eloquent language from a tender age.

Because of its close attention to its language, Quraysh gained a large fame in eloquence in speech and poetry. It is also said to have selected the most eloquent speech/language of the different Arab tribes through its trade contact during the season of

pilgrimage, as Al-Farraa' – quoted in A' Suyuti (1325 H) – maintains. The eloquence of Quraysh made some researchers assume that the language of the Holy Qur'an and that of Quraysh are one and the same and that it is in turn the highest in register. Ar-Rajhi (1969) refutes this claim by narrating the saying of Ibn Abbas (Ibn Faris (1910), p.28 and A'Suyuti (1325 H), p.127) – who was a companion of the prophet – that the Qur'an was revealed in Seven *Ahruf*– languages– five of which were from *Hawazin* which included tribes like *Sa'ad bin Bakr*, *Jasham bin Bakr*, *Nasr bin Mo'awiyah* and *Thaqeef*².

Another saying Ar-Rajhi (1969) uses is the one in (A'Suyuti (1325 H) narrated by Omar Ibn AlKhattab – who was one of the four Muslim Kalifas after prophet Mohammed's death – wondering how Mohammed (PBUH) was the most eloquent of Qurayshis although he was not raised among them. I agree with Ar-Rajhi (1969) regarding the second opinion that the Qur'an was not revealed in the language of Quraysh based on the verse from the Holy Book that it was revealed “بِلِسَانٍ عَرَبِيٍّ مُبِينٍ” (*bilisān*ⁱⁿ ‘arabiyyⁱⁿ mubīn) (in the perspicuous Arabic tongue; 26:195; Ali (2001)) and not specifically in the *tongue*/speech of Quraysh.

Thus far, I have discussed in no great detail the geographical, historical and genetic affiliation of Arabic before Islam. I have not spent much time in doing so for two reasons: (1) the topic this thesis addresses is linguistic in nature and (2) other historical, Islamic and dialectal books take these aspects as their central theme. From the above, we could declare that Arabic precedes the language of the Holy Qur'an (represented in *Tajwīd*). Next, I try to shed some light on how the different dialects of Arabic before Islam manifest *Tajwīd* phenomena.

² An Islamic historical question that might be worth pursuing is how much these specific tribes accepted/embraced Islam if the Qur'an's language is really a combination of the languages of these tribes.

1.2.2.3 *Tajwīd* phenomena in the dialects of Arabic before and after Islam

One of the assumptions the present work is based on is that *Tajwīd* phenomena including nasal *n* patterns are actually found in Arabic dialects before and after Islam. Ar-Rajhi (1969) does a decent job in trying to trace different *Tajwīd* phenomena back to the different *quraa'* of *Tajwīd* (the famous reciters/orthoepists of Qur'an: who study the correct pronunciation of the Qur'an) and ultimately to the original Arab tribes which used these phenomena in their every-day speech. This particular finding supports the point raised earlier that the different Arabic dialects used before Islam are not vernaculars since Qur'an represented in *Tajwīd* is the highest in register.

The reader could refer to Ar-Rajhi (1969, p.96-201) for concrete examples of different phenomena of *Tajwīd* which are found in pre-Islamic Arab tribes' speech. We are more concerned with nasal *n* patterns. Ar-Rajhi tells us that (1) *'idghām* (*gemination*) was used by those tribes which used fast pace in their speech like the dialects of *Kufah* and *Syria* and the tribe of *Tameem* (see map (2) in appendix (1)) whereas (2) *'izhār* (*zero nasal assimilation*) was used by the tribes living in *Hijaaz* whose speech was careful and clear and featured by a slow tempo.

As to how *Tajwīd* is used in today's Arabic dialects, unfortunately no reference is pinpointed in the literature yet (at least to my knowledge) except in Hamid's (1984) examination of the Sudanese Arabic which exhibits patterns similar to *'izhār* (*zero nasal assimilation*), *'ikhfā'* (*nasal place assimilation*) and *'iqlāb* (*labial place assimilation*). Examples from Sudanese Arabic are given in chapter three. Next, I give a sociolinguistic account of both Modern Standard Arabic (MSA) and the Language of the Holy Qur'an (LHQ).

1.2.3 Modern Standard Arabic and the Language of the Holy Qur'an

Many researchers have used different terminology when referring to the different varieties of Arabic. Graidner (1925) uses the terms Classical Arabic (CA) and literary Arabic while Cantineau (1946) uses *ancien arabe* or “Old Arabic”. Moreover, Ferguson (1959) adopts ‘High style’ and Al-Badawi (1975) *fushat 'aturāth* (fuṣḥet ʔaturaθ) (i.e., pure speech). Belkaid (1984) differentiates between a Modern Standard Arabic and ‘Classical Literary Arabic and dialectal Arabic’ when denoting the highest formal register ‘Classical Arabic as it is realized today’.

Scholars from the east and west as well as Arabic speakers regard *Tajwīd* as the most validated or dependable reference of Arabic sounds, even when the LHQ came after Arabic. This is due to the eloquence of the LHQ and it's being higher in register. The language of the Holy Qur'an is restricted, however, to liturgical uses and is taught through intensive training in theological, linguistic and historical disciplines. Mitchell (1990, p. 3) as cited in Newman (1987) refers to the style of *Tajwīd* as ‘High Classical Pronunciation’ (HCP) or ‘Classical Arabic Reading Style (CARS)’. The reader might ponder at this point what MSA is and how it is used nowadays.

Both MSA and the LHQ are descendants of CA or what has been referred to as “Classical Literary Arabic” (Belkaid 1984). MSA is the official language of all the Arab countries and medium of instruction in the schools of these countries. Moreover, MSA is not spoken by any particular Arab country any more but rather is revived in literary works and formally used in the media and press.

The LHQ, usually labelled as ‘*al-'arabiyyah al-fuṣḥá* (/əɫʔarabijəh əɫfuṣḥə/), is the sacred and divine language of the Holy Book; Qur'an. It constitutes –for Muslims –

the actual words of God as they were revealed to the prophet Mohammed which are “outside the limits of space and time, i.e., ... have existed “before” time began with the creation of the world” (Ferguson 1959, p. 330).

Now we are in a language situation where there are, in fact, three varieties of Arabic: the LHQ (highest register of CA), MSA (taught in schools and used in formal contexts) and many colloquial Arabic dialects. The term register is defined by Crystal (2003) as “a variety of language defined according to its use in social situations, e.g., a register of scientific, religious, formal English.” (p. 393).

Having three interrelated varieties like the ones mentioned above which belong to the same language is referred to as **triglossia**³ in sociolinguistics, a variant of **diglossia** about which Ferguson (1959) tells us that

“In addition to the primary dialects of the language..., there is a very divergent, highly codified ...superposed variety, the vehicle of a large respected body of written literature, either of an earlier period or in another speech community, which is learned largely by formal education and is used for most written and formal spoken purposes but is not used by any sector of the community for ordinary conversation” (p.336)

According to this definition of **diglossia** or **triglossia**, both the LHQ and MSA stand as high varieties (H) of Arabic, with the LHQ being higher (HH) than MSA (because of its divine status), and the various colloquial Arabic dialects as low varieties (L). **Triglossia** in the current study supports the claim that meaning could include *register shift* as a pragmatic “meaning” element and that it is not limited to morphosyntactic ones. Now, we turn to *Tajwīd* which distinguishes the LHQ from MSA.

³ **Triglossia** is “a situation where three varieties or languages are used with distinct functions within a community. An example of a **triglossic** situation is the use of French, Classical Arabic and Colloquial Tunisian Arabic in Tunisia, the first two being read H and the last L” (Crystal, 2003, p. 138-139).

1.2.4 The tradition of Holy Qur'an's recitation: *Tajwīd*

The juncture point between MSA and the LHQ lies in the fact that when the latter is spoken aloud, it has to be recited using the tradition of *Tajwīd*. This word, being a noun, is derived from the Arabic trilateral verb [dʒāw:əd] (jawwad) roughly meaning, “to make good or perfect” (Lisān al-‘arab, Ibn Mandhūr 1981, IV, p. 110). In Practice, *Tajwīd* refers to **producing every sound from its place of articulation with its inherent features and the features it gets through phonological processes** (Abdullah no date, Nasr 1994, Abu-Zaid 1997, Kakhi 2001, Ajmi 2001 and Al-Qanoobi 2002). *Tajwīd* only pertains to the language of the Holy Qur'an as its prime goal is to prevent the reciter of the Holy Book from making mistakes when reciting; in other words, to maintain the *sacredness* of the Holy Book.

The LHQ has a phonology of its own for there are more than 28 different phonological patterns or processes to aid the Holy Book's reciter in reciting in the appropriate manner prescribed. The tradition of *Tajwīd* is what tells us how the Holy Qur'an was and should be recited. Different phonological processes include vowel lengthening, assimilation and deletion. The three sonorants /n/, /m/ and /l/ are of high import in the LHQ because many of the processes of lengthening/gemination and assimilation affect them. Some of the *Tajwīd* patterns or processes are found; nonetheless, across the Arabic dialects or even some of the Semitic languages as will be shown throughout the present work. Because *Tajwīd* is a tradition followed only when reciting the Qur'an, the language of it is different from everyday Arabic/Modern Standard Arabic.

Of the twenty-eight different phonological phenomena of *Tajwīd*, nasal assimilation *n*⁴ might be viewed among the simplest phenomena since it is always the starting point for *Tajwīd* learners. Some of the other *Tajwīd* phenomena include patterns of *nasal m assimilation*, *vowel lengthening* with its different subtypes and *gemination of n and m*. In *nasal m assimilation*, three patterns are observed. These are *'ikhfā' shafawiy*; concealing the labial sound (m), *'idghām* (*gemination* with nasalization) and *'izhār shafawiy*; retaining the /m/ and pronouncing the following sound without nasalization (*zero nasal assimilation*). In *'ikhfā' shafawiy*, the vowel preceding the m nasalizes, the m is not realized as a full nasal but rather more as a prenasalized segment on the following /b/. Only one sound is involved in this pattern which is the voiced bilabial stop /b/ as in /kalbuhum ba:ṣiṭun/→kalbuhū ^mba:ṣiṭun. In *'idghām*, the m assimilates to the place and manner of a following /m/ sound creating a geminate/ doublet with it and nasalizes a preceding vowel as in /jaʿidukum maḥfirah/→ jaʿidokūm maḥfirah. As to *'izhār shafawiy*, all the other 26 sounds of the Arabic alphabet (excluding /b/ and /m/) trigger no assimilation or nasalization. An instance of this pattern is /ʔalam tara/→ʔaləm tare.

⁴ Nasal n assimilation is taken as an example of the different twenty-eight patterns of *Tajwīd*. This research makes no claim that nasal n is a distinguishing or a distinguished set of phenomena in *Tajwīd*. The research, however, assumes that Kurisu's (2001) Realize Morpheme Theory could account for all the range of *Tajwīd* phenomena and not only nasal n assimilation.

1.3 Language background

1.3.1 Previous work

It is striking that little has been written about the recitation of the Holy Qur'an by modern linguists. The literature cites few works in English which study the phonetic and phonological aspects of *Tajwīd*, two of which are "The text of the Qur'an, with reference to its phonetic aspect of tajwid" by Yusuf al-Khalifa, Abu Bakr (1975)⁵ and "Qur'anic Recitation: Phonological Analysis" by Gouda (1988). Nevertheless, an abundant amount of work has been done in Arabic on *Tajwīd* and "'ilm AlQir'aat AlQur'aniyyah" (science of Qur'anic readings) the latter of which focuses on the different Sunni variations/readings of the Qur'an as recited by the prophet Mohammed. Nonetheless, most of these references are either historical, literary or pedagogical in focusing on how the Qur'an should be recited properly using the different rules of *Tajwīd*.

The reader can refer to a number of works or manuals in Arabic which define *Tajwīd*, explain its different 'ahkām' or phenomena and exemplify each of them. Some of the recent efforts include "*'ilm 'atajwīd; Riyaḍ 'asālikīn fī Ahkām tilāwat 'al-kitāb 'al-mubīn*", Abdullah (no date), "*Ahkām 'atajwīd wa qawā'id 'al-Qur'ān 'al-Karīm*", Abu-Zaid (1997), "*'al-barnāmaj 'adhakī encyclopedia*", electronic CD, "*'al-Qabas fī 'ilm 'atajwīd*", Al-Qanoobi (2002), "*Silsilat Mashāhīr 'al-Qurrā': Ahmed al-Ajmi*", Ajmi (2001), "*Mu'alim 'atajwīd*", Basafar (2001), "*'al-Mughni 'al-Mufid fī 'ilm 'atajwīd*", Kakhi (2001) and "*Ghayat 'al-Murid fī 'ilm 'atajwīd*", Nasr (1994).

⁵ This PhD dissertation could not be located in the original place where it was published.

In English and French, it is worth mentioning that some studies have looked at “*‘ilm ‘al-qirā’āt wa-tajwīd*” from a linguistic point of view. These – as cited in Gouda (1988) – are “*Tajwid as a source in Phonetic Research*”, Semaan (1962), “*Linguistics in the Middle Ages: Phonetic Studies in Early Islam*”, Samaan (1968), “*Qur’anic Variations (‘Ilm Al-Qira’at): An Historical-Phonological Study*”, Al-Wohaibi (1982), “*Cours de Phonétique Arabe*”, Cantineau (1960) and “*Traité de Philologie Arabe*”, Fleisch (1961).

Of interest is the work on “Beyond The Written Word: Oral Aspects of Scripture in the History of Religion” (1987) by William Graham. Although Graham does not approach the art/science of Qur’anic cantillation or recitation from a linguistic perspective, he spends some time in chapter eight talking about how *Tajwīd*- for Muslims- represents an “attempt to preserve the living word of God in the full beauty and full range of meaning with which it was given and transmitted by the Prophet” (p. 100). This supports the current study’s stand that *Tajwīd* – through its different phonological patterns – reflects *sacredness*⁶ (holiness) which is perceived as a meaning element. Related to this point of *sacredness* is the issue of the Qur’an being inimitable (miraculous; *mu’jiz*) which Graham argues is manifested in the oral/aural recitation of the Qur’an (p. 101).

Graham also sheds light on the science of Qur’an’s variations “*‘ilm ‘al-Qirā’ at ‘al-Qur’āniyyah*” which he introduces before approaching the art of *Tajwīd*. It seems important to differentiate between *Tajwīd* and the science of Qur’anic readings (*Qirā’ at Qur’āniyyah*) for our readers although the two sciences/arts are always conjoined with one another.

⁶ A question that might arise is whether *Tajwīd* is only sacred to Muslims (i.e., whether it is a function of acquired culture). This is a debatable issue that is beyond the scope of this study.

Graham defines *qirā'ah* (the singular form of *qirā'āt*) in three ways: (1) science or art of reciting Qur'an aloud, (2) "a textual "variant" for a particular word or phrase in a manuscript text" (p. 97) and (3) one of the seven or nine readings of the people who received the Qur'anic reading from the prophet Mohammed in the first two centuries A.H. (seventh and eighth centuries C.E.). He then describes *Tajwīd* as "the actual recitative practice or method of Qur'an cantillation" (p.100) though admitting that both *Tajwīd* and *Qirā'āt* are inextricable.

The most relevant study to the current research is "Qur'anic Recitation: Phonological Analysis" by Gouda (1988). This work is very informative to serious linguists and others who wish to learn about Qur'anic recitation. Gouda starts his well-outlined descriptive study with a historical background on how *Tajwīd* was transmitted after laying out the objectives and background of his study.

In chapter one, he distinguishes between *Tajwīd*, *Qirā'āt* and *Tafsīr*. Gouda describes *Tajwīd* as "the system which codifies the divine language and accent of Qur'anic recitation in terms of sectioning of the text, phonetics, rhythm, and timbre" (p.18), *Qirā'āt* as characterizing "the different text-systems (Qur'anic variant) in use and codifies the variant applications of the rules of *Tajwīd*" (p.19). He defines *Tafsīr* as being concerned "with the meanings of the text, that is, exegesis and interpretation" (p.19). He then introduces some Arabic terminology of *Tajwīd* to the reader such as *'ishmām*, *'ishbā'*, *'ikhtilās*, *Madd*, *Tafkhīm*, *Tarqīq*, *Talyīn* and *Waqf* in chapter two.

In chapter three and four, Gouda describes the places and manners of articulation of *Tajwīd* consonants and vowels. Of relevance are the assimilatory patterns of *'idghām*

“gemination”, ‘*ikhfā*’ “nasal place assimilation”, ‘*iqḷāb*’ “labial place assimilation” and ‘*izhār*’ “zero nasal assimilation” for which he provides a phonetic and phonological description with examples of each. Although the title of the dissertation is very suggestive, no formal (non-linear) phonological analysis within any theoretical framework is provided.

1.3.2 Method of collecting data

A corpus of two hundred and fifty five representative words has been recorded and put together from the Holy Qur’an for the purpose of the current work (see appendix (2)). The method of studying the LHQ words is based on elicitation (of specific words where processes are applied) rather than on recitation⁷. I have depended on a version of the Holy Qur’an which uses salient symbols for the different *Tajwīd* patterns (see appendix 4.). The investigator as a native speaker of Arabic did the entire recording, then phonetically transcribed the words of the data in IPA (International Phonetic Alphabet) with the aid of Dr. Czaykowska-Higgins and Dr. Esling.

The words studied are arranged in tables where the first column shows the words in IPA transcription. Column two represents the words in Arabic. Column three cites the words and the verses in which they appear in the Qur’an. The last column reflects a transliteration of the words in Roman letters. The phenomenon investigated is divided into four patterns. These patterns include ‘*izhār*’ (*zero nasal assimilation*), ‘*idghām*’ (*gemination with/out nasalization*), ‘*iqḷāb*’ (*labial place assimilation*) and ‘*ikhfā*’ (*nasal place assimilation*).

⁷ Prosodic influence might have obscured the specific phonological processes had recitation been the methodology adopted.

Every pattern in the data is divided into two subtypes; words ending in “non-syllabic n; *nūn sākinah*” and words ending in “**tanwīn**; nunnation”. The latter is a marker of indefiniteness achieved by an additional n added to the end of nouns both in pronunciation and connected speech. Tanwīn is basically a diacritic appearing on nouns. Its symbol is either two fathah ^ˆ, two dammah ^ˆ or two kasrah ^ˆ,⁸ reflecting the case marking of the noun. Examples a. through c. in 1. below show the three case markings of the Arabic of LHQ with Tanwīn diacritics shown at the end of the first noun.

1. Regular speech (no Tanwīn)	Connected speech (with Tanwīn)
a. nu:r mubīn (نور مبین)	a'. nu:run mubīn (نور مبین) (nominative case)
b. kuḥw ʔaḥəd (كفو احد)	b'. kuḥwən ʔaḥəd (كفوا احد) (agentive case)
c. zawdʒ bahiʒ (زوج بهيج)	c'. zawdʒim bahiʒ (زوج بهيج) (jussive case)

In Arabic, Tanwīn is not indicated in writing or when making a pause. It is not a morpheme as it does not have a meaning of its own but rather can be seen as a functional morphological marker indicating case; an enclitic (word ending) in other words.

1.3.3 Background about the reciter/subject (researcher)

The recitation of the Qur'anic words used in this thesis is all done by the researcher who is a native speaker of Masirah dialect of Omani Arabic. The researcher started studying *Tajwīd* in a public school in grade four- as it is the norm in Oman- and has developed an interest in learning more about it to aid her in reciting the Holy Book ever since. It is important to note that learning *Tajwīd* is achieved by listening to an accomplished reciter and practicing with him/her.

Some dialectal variations in reciting Qur'anic sounds and words are witnessed. For instance, the sound /خ/ in Arabic in general is perceived either as a velar /x/ sound

⁸ The symbol for fathah / ^ˆ / indicates the agentive case, the dammah / ^ˆ / the nominative case and the kasrah / ^ˆ / the jussive case.

(Gouda (1988), Thelwall and Sa'adeddin (1999)) or a uvular /χ/ (Zawaydeh (1999), McCarthy (1991), Hayward and Hayward (1989), Herzallah (1990) and the researcher). The perception of the sound /خ/ is of significance for the present work since even when it is used as a velar sound in some dialects, this sound patterns with other guttural sounds like /ʕ/, /ʁ/, /ħ/, /ʔ/ and /h/ and hence could be said to be a uvular.

The remainder of this chapter deals with the theoretical framework and assumptions adopted in describing and analyzing the four patterns of nasal n in LHQ.

1.4 Theoretical assumptions

1.4.1 Optimality Theory

This thesis draws upon a constraint-driven theory, that of Optimality Theory (OT) (Prince and Smolensky 1993). Basically, (OT) assumes that all languages of the world have constraints governing the grammars of these languages and that these constraints are actually derived from a fixed set of universal constraints, those of Universal Grammar (UG). This principle- constraints are universal- is what practitioners of OT know as *universality*. Another assumption of OT is *violability*, which dictates that constraints are violable, but that violation should be minimal (Prince and Smolensky 1993).

According to OT, output forms in languages are selected by universal constraints which are violable and ranked in accordance with a language specific hierarchy of these constraints. The optimal output or the most 'harmonic' form is the one which violates the least number of constraints which are lower-ranked in constraint hierarchies. Prince and Smolensky's (1993) Optimality Theory ranks constraints based on constraint interaction, specifically the interaction of *markedness* and *faithfulness* constraints.

Markedness constraints require that the output forms be well formed, eliminating by this uncommon or least common structures or segments. Faithfulness constraints ensure similarity between input and output forms; in other words, they require structure preservation. The three main components of the OT grammar are summarized as follow:

Lexicon: contains lexical representations (or underlying forms) of morphemes, which form the input to:

Generator: generates output candidates for some input, and submits these to:

Evaluator: the set of ranked constraints, which evaluates output candidates as to their harmonic values, and selects the optimal candidate. (Kager 1999, p. 19)

OT plays a very important role in analyzing the data of the LHQ especially assuming output-output mapping (Benua 1995) rather than input-output mapping. This is related to one leading principle of OT labelled as *richness of the base*. According to the latter, the lexicon supplies a free number of input specifications to the Generator (i.e., all legitimate phonological representations could appear as inputs in any language (Crystal 2003, p. 401)). This results in mapping the output forms with unreliable inputs. Thus, the LHQ has to assume an output-output mapping (Benua 1995); i.e., mapping between output forms of bare stems and output forms produced by the Generator. What ratifies the application of output-to-output mapping to the LHQ's data is that the output forms are compared against already existing words in the same language; Arabic. For instance, the word $m\tilde{a}n\theta ur\emptyset$ with the application of 'ikhfa' (*nasal place assimilation*) is compared to the same word $m\Delta n\theta ur\emptyset$ without 'ikhfa' in MSA.

1.4.1.1 Realize Morpheme Theory (Kurusu 2001)

In this present work I take into account the special status of the LHQ and the revered meaning of *sacredness* implied by *Tajwīd*. In order to provide a theoretical account of this position, I take as my standing Kurisu's (2001) Realize Morpheme theory. As we will see below, the theory needs to be modified so that it accounts for this holy meaning.

Kurusu's (2001) theory of Realize Morpheme assumes that every morpheme in the underlying representation receives some overt phonological exponence on the surface. Thus the output form has to be phonologically non-identical to the input form in order to satisfy RM. According to the principles of RM, the four patterns of the LHQ's nasal data are viewed as exponents of a morpheme. But, this cannot hold for the LHQ's data since *Tajwīd* is not a morpheme as such. Instead, the patterns that occur in *Tajwīd* have the effect of connoting the *sacredness* of the Holy Qur'an. In this sense, the fact of the patterns themselves signals the holy meaning. This relation between forms and meaning resembles that of *sound/phonetic symbolism* ((Jespersen (1922), Neman (1933), Brown (1958), Greenberg (1961), Kess (1992)) where certain sounds/forms correspond to particular meanings in language. This term will be illuminated in chapter four.

In this work, I propose to name Kurisu's (2001) theory of Realize Morpheme as "Realize Meaning Theory" to account for non-morphosyntactic meanings as well as morphosyntactic ones.

The analysis I adopt relativizes faithfulness constraints to the meaning (*Tajwīd*; *sacredness*) being expressed. This is reflected in the fact that each pattern of nasal n in the LHQ is determined by ranking faithfulness constraints in respect to **RM**. The

underlying meaning of *sacredness* is realized in all patterns of nasal n even when no overt phonological change is manifested as in *zero nasal assimilation*. In the latter case, the meaning of *sacredness* is realized within the whole set of phonological patterns constituting *Tajwīd*.

The ranking used in the analysis is one which has RM outranked by one faithfulness constraint and two markedness constraints. The markedness constraints are $*\tilde{V}(N)?$ and ***Pharyngeal Geminate** while the faithfulness constraint is **Max- μ (T)**.

1.5 Objectives

This thesis aims at providing a phonological account for the pairing of *sound* and *meaning* of *Tajwīd* as a tradition of the Holy Qur'an's recitation. This is done by examining and analyzing the four patterns of “anūn ‘asākinah” (non-syllabic nasal n). As a Muslim, I am- like any other Muslim- obliged to understand and apply the different processes of *Tajwīd*, since its ultimate goal, according to Muslims, is to preserve the word of Allah (God) in the form and sound with which it was revealed to the prophet Muhammed (PBUH). As a linguist, I feel a sense of duty to bring to light a religious tradition which is linguistically very rich and which has not been given its due by modern linguists. Unfortunately, past studies on *Tajwīd* have sufficed with the description part of linguistic investigation. Here, I strive to go one step beyond mere description of this tradition to actual analysis of linguistic aspects related to it.

As a matter of fact, I find myself zooming in and out when analyzing *Tajwīd*. Looking at the big picture, *Tajwīd* with all its phonological processes could be argued to have an underlying linguistic meaning. Abstracting away from historical controversy about this tradition and its development, I limit myself to the linguistic meaning inherent

to all *Tajwīd* phenomena, namely that of *sacredness* (semantic meaning) and *register shift* (pragmatic meaning/function). In this respect, I raise the question of how a grammar could express such a semantic and/ or pragmatic meaning formally.

Considering the other side of the coin, I concern myself with the phonology of *Tajwīd*. Here, I concentrate on the phenomenon of non-syllabic nasal n assimilation (‘aḥkāṁ ‘anūn ‘asākinah). After describing each and every pattern of “‘anūn ‘asākinah” phonologically, I investigate how natural sound classes are distributed among LHQ patterns.

1.6 Summary of chapter one

The phonological patterns of *Tajwīd* are also- by large- found in the different dialects of Arabic like Sudanese Arabic and even some of the Semitic languages and dialects like the languages of Eastern Gurage. Nonetheless, the whole set of the nearly twenty-eight patterns comprising *Tajwīd* is collectively used only when reciting the Holy Qur’an or when performing the five daily prayers. This particular distinction helps us understand the logic behind the association of the meaning of *sacredness* to the different patterns of *Tajwīd* and not to the individual ones used in the different Arabic dialects or Semitic languages.

Chapter one serves as an introduction for the coming three chapters. It covers different aspects about the Language of the Holy Qur’an (LHQ) including its genetic affiliation, geographical location and the sociolinguistic differences between it and Modern Standard Arabic. It also reviews past research about the language and the phenomenon investigated, and presents the method by which the data used was collected,

and demonstrates the framework followed in analyzing the LHQ patterns of 'idghām , 'ikhfā', 'iqlāb and 'izhār.

The next three chapters explore the phenomenon of nasal n assimilation in the LHQ in depth. Chapter two describes the different patterns in detail. Chapter three explores how the LHQ sounds are grouped into natural sound classes. Finally, chapter four analyzes the four patterns of “anūn 'asākinah” using the framework of Kurisu's (2001) Theory of Realize Morpheme set in Optimality Theory (Prince and Smolensky 1993).

Chapter 2

Description of Language of the Holy Qur'an data

2.1 Introduction

This chapter paves the path towards analyzing the LHQ data. This is achieved by (1) describing the sounds of the LHQ and some related features like nasality and (2) describing how *Tajwīd* ties to language via the different ways used in recitation and the four patterns of nasal n under examination; 'idghām , 'ikhfā', 'iqlāb and 'izhār .

2.2 Sounds of the language of the Holy Qur'an (LHQ)

Table (1) and figure (2) in appendix (3) show the consonant and vowel inventory of the language of the Holy Qur'an. Almost all the background information on the sounds illustrated comes from my immediate native knowledge of the Holy Qur'an, Modern Standard Arabic and Omani Arabic, some from Thelwall and Sa'adeddin (1999), Zawaydeh (1999) and through personal communication with Dr. John Esling.

2.2.1 Discussion of sounds

2.2.2. /Consonants

According to chart (1), there are 28 consonants paralleling those of the Arabic orthography. All the sounds represented in the LHQ inventory follow the International Phonetic Alphabet transcription (IPA).

1. Consonant phonemic inventory of the LHQ

	bi-labial	labio-dental	dental	denti-alveolar	alveolar	post-alveolar	palatal	velar	uvular	pharyngeal	glottal
Plosive	b			t ṭ	d ḍ			k	q		ʔ
Fricative		f	θ ð		s ṣ	z ʒ			χ ʁ	ħ	h
Affricate							dʒ				
Sonorant	m				n r l						
approximant	w						j			ʕ	

The consonantal inventory shows that there are some evident distributional gaps. First, as is typical of Arabic dialects, the voiceless bilabial stop p is absent from the inventory of the LHQ. Second, the voiced velar stop g is substituted with the affricate dʒ which in some dialects of Arabic is seen as a form of modernity and urbanity (prestigious) like in Ammani Arabic (Zawaydeh 1999). The velar stop g is present in some Arabic dialects instead⁹. As to the fricative and affricate classes of sounds, the voiced labiodental fricative v and the voiceless post alveolar affricate tʃ¹⁰ are missing from both Arabic and the LHQ.

⁹ An example showing the voiced velar stop g is gá:səm= a male name, which comes from my own dialect (Masirah dialect of Omani Arabic). However, it seems that the use of the velar voiced stop is limited to proper nouns as it is either pharyngealized or palatalized in other instances as in jəgʕʔəd= he sits, jəgʕsəml i^h= he gives me some.

¹⁰ The affricate tʃ is witnessed in some Arab Gulf countries like Kuwait. An example of the usage of this sound is tʃəði:h= like that.

On the other hand, both the LHQ and MSA have pharyngealized or uvularized segments (emphatics¹¹) like ʈ, ɖ, ʈ̣, ɖ̣ and ʕ̣(ʕ). The classical view about these sounds was that they were rare cross-linguistically (on the basis that they physiologically difficult to produce). Nevertheless, today's research has proved this hypothesis to be false. Irish, for example, has a large palatal-velar set of contrasts, and Caucasian languages have pharyngeals like /χ̣/.

The pharyngealized (retracted tongue root) glottal stop ʕ̣ (as transcribed in Thelwall and Sa'adeddin 1999) is represented in chart (1) as a pharyngeal approximant [ʕ̣]. In some Arabic dialects (like Damascene) the voiced pharyngeal guttural /ʕ/ could be a stop, but in other dialects like Omani and Moroccan Arabic it is an approximant. The pharyngealized lateral sound (ḷ) is not added to chart (1) though some might treat it as a separate phoneme (Thelwall and Sa'adeddin 1999).

The LHQ divides its consonantal inventory into three classes: obstruents, sonorants and gutturals, the latter of which excludes emphatics (like /ʕ̣/, /ɖ̣/, /ʈ̣/ and /ð̣/) and uvular /q/. Obstruents (See 2.) (plosives, fricatives and affricates except /b/, and including emphatics) seem to act together as a trigger of 'ikhfā' (*nasal place assimilation and nasalization of a preceding vowel*).

2. Sound class of 'ikhfā'

- a. ʔanda:da → ʔēnda:də (plosive) أندادا
- b. mansurə → māḷɲurə (fricative) منصورا
- c. ʔandʒajna:kum → ʔēndʒajna:kum (affricate) أنجيناكم

¹¹ The underdot in sounds like /ʈ̣/ and /ɖ̣/ signifies uvularized or pharyngealized segments (it's not technically IPA).

Of all the obstruents of the LHQ the voiced bilabial stop /b/¹² forms a class by itself triggering *ʾiqḷāb* (*labial place assimilation*), where nasal n assimilates to the place (labial) of the following voiced bilabial stop /b/ becoming an /m/ as in *ʔan bu:rik* → *ʔām bu:rik*. *ʾiqḷāb* could be looked at as a special case of *ʾikhfā* which is made distinct based on the substitution of nasal n with nasal m.

The third pattern includes all the consonantal resonants (/j/, /r/, /m/, /l/, /w/ and /n/) (3.) forming a natural class¹³. Bare *gemination* (total assimilation of the nasal to a following resonant) takes place when the sonorant is a liquid (/r/ or /l/), whereas *gemination* and nasalization of a preceding vowel occur when the sonorant is a nasal (/m/ and /n/) as in b. and d. When the sonorant is a semivowel, gemination of the glide (/j/ or /w/) and nasalization of it is observed as in a. and f. below.

3. Sound class of *ʾidghām*

- a. *min wā:q* → *miṛw wā:q* من واق
- b. *qawlun mafru:f* → *qawlūm mafru:f* قول معروف
- c. *laʔin lam* → *laʔil lam* لنن لم
- d. *kullan numidu* → *kulān numidu* كل آمن
- e. *min riba:t* → *mir ribat* من رباط
- f. *xiṭaban jawm* → *xiṭabāḷ jawm* خطابا يوم

The final set of sounds treated as a natural class by the LHQ is gutturals (see 4.

below) which resist any phonological change to nasal n. In the LHQ, this group includes

¹² Biblical Hebrew as Southern and Vaughn (1997) maintain, favors *nB* and *Bn* among other groupings and freely allows clusters like *mp*, *pm*, *bm* and *mb*, in contrast to the LHQ.

¹³ The sonorants /m/, /n/, /r/, /l/, /j/ and /w/ seem to pattern as a natural class in Semitic Ethiopian languages like East Gurage as argued by Hetzron who excerpted examples proving this from the *Etymological Dictionary of Harari* (EDH). Expected nasal n is absent when the second radical of a consonant root is any of the six resonants.

the two uvulars /χ/ and /ʁ/ (which might be slightly affected by 'ikhfā' (*nasal place assimilation*)), the pharyngeals /ħ/ and /ʕ/ and the laryngeals /h/ and /ʔ/¹⁴.

4. Sound class of 'izhār

a. walmunḫaniqah → walmunḫaniqəh والمنخقة

b. min ʕil → min ʕil من غل

c. wanḥar → wanḥər وانحر

d. janʕiq → janʕ eʔiq ينعق

e. ʔin huwa → ʔin huwə ان هو

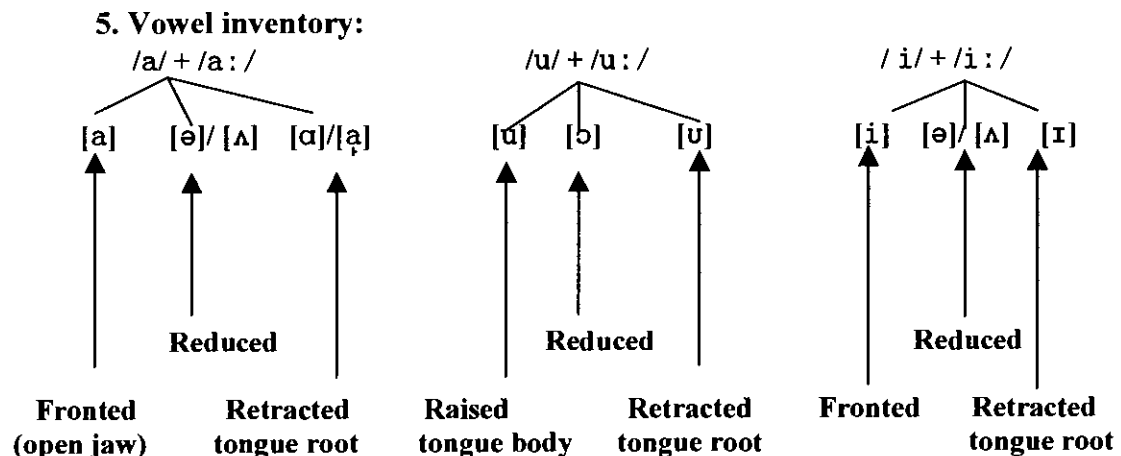
f. ʔanʕamta → ʔanʕamtə أنعمت

Some researchers like Zawaydeh (1999) identify the guttural class in Arabic to broadly include emphatics and the uvular /q/ in addition to the two uvulars /χ/ and /ʁ/, the two pharyngeals /ħ/ and /ʕ/ and the two laryngeals /h/ and /ʔ/. She defines it as “a group of sounds that have a constriction in the back part of the vocal tract” (1999, p. 23). Chapter three presents evidence that the uvular /q/ and emphatics in the LHQ pattern together with the other obstruents and not with the six gutturals of 'izhār (*zero nasal assimilation*).

¹⁴ In Abdullah (no date), uvulars are said to undergo (ʔḥar ʔadnə)(lowest rate of Idhhaar), pharyngeals (ʔḥar ʔawṣṭ)(middle Idhhaar) and laryngeals (ʔḥar ʔaʕlə)(highest rate of Idhhaar). These three rates correlate with the place of articulation of each guttural; the furthest down the guttural towards the larynx, the highest manifestation of Idhhaar or no nasal assimilation. This explains why uvulars when preceded by nasal n seem to act like velar sounds (i.e., undergoing nasal place assimilation).

2.2.2.2 Vowels

Arabic has only three underlying vowels, a number below the average on the UPSID¹⁵ when compared with the other languages of the world (Newman 1987). Graidner (1925) was the first to place the Arabic vowel ‘triangle’ on the map of the cardinal vowel. Mitchell (1993) contends, “the vowel system of Arabic is a simple one of three vowel units or phonemes – open, close front, close back – with a superposed short/long distinction applicable to all three” (p. 138). The Language of the Holy Qur’an is not different in this respect from Arabic. Figure 5 (and in appendix 3) shows the vowel inventory of the LHQ¹⁶. According to the data collected for this work, some surface vowels appear in the LHQ only as a result of some phonological processes such as diphthongs and nasalized vowels.



Some allophonic variations are

Diphthongization

i → e^ɪ in the environment of pharyngeals and uvulars

i → ɪ^ə

¹⁵ UPSID stands for UCLA Phonological Segment Inventory Database which was developed by Ian Maddieson at the University of California, Los Angeles. It first appeared in Maddieson, I. (1984). *Patterns of sounds*. Cambridge University Press.

¹⁶ Many thanks go to Dr. John Esling who helped me define and shape the phonetic characteristics of the vowels of LHQ.

According to 5. and Thelwall and Sa'adeddin (1999) on Arabic vowels, the three underlying vowels of the LHQ are the low unrounded back vowel /a/, the high rounded back vowel /u/, and the high unrounded front vowel /i/. These vowels respectively appear in /wal/, /huwa/ and /jawmin/. Each vowel has three allophones; reduced, retracted and fronted or raised (elsewhere).

Vowel reduction occurs before a word boundary as in ʔəbqa→ʔəbqə, ʔinfiru:→ʔiŋfirɔ: and musakʔara:tin fi→ musakʔara:tiŋ fə. Retraction of vowels takes place in the environment of retracted tongue root, pharyngeal consonants or emphatics. The symbol used for retraction is /ɑ/ or /ɤ/. Examples of these are given in 6.

6. Vowel retraction environments

- a. walʔanʔa:m→wəlʔənʔɑ:m¹⁷ والأنام (after a voiced pharyngeal)
- b. man ɒʔalam→man ɒʔaləm من ظلm (after an emphatic)
- c. min ʔind→min ʔind من عنd (after a pharyngeal)
- d. husn^{an}→husn^{an} حسنا (after a voiceless pharyngeal)

Elsewhere, the three vowels /a/, /u/ and /i/ surface without changes in quality as in the instances in 7. Fronted and raised tongue bodies below refer to the positions of the underlined vowels.

7. Vowel environments in the LHQ

- a. maθal→maθal (fronted) مثلا
- b. jawmin→jawmin (raised tongue body) حوي

¹⁷ The English translation of the LHQ data is not given in this work since the words used are taken out of context, which makes it difficult in most cases to translate them into English. I choose not to give the meanings of these words for consistency purposes.

c. huwa→huwa (fronted) هو

2.2.1.2.1 Vowel lengthening

Just as is the case in most if not all the dialects of Arabic like Lebanese Arabic (Nasr 1960), vowel length is phonemic in LHQ as such contrast creates differences in meaning. Examples of long vowels in LHQ are shown in 8.

8. Vowel lengthening in LHQ

Phoneme (short)

a. /ʔaradun/¹⁸ (sin) عرض

b. /nuḏur/²⁰ (signs from God) نذر

c. /fa:riqa:t/²² (angels/ Qur'an) فرقات

Phoneme (long)

a'. /ʔa:riḏun/¹⁹ (rainy cloud) عارض

b'. /nuʃu:rə/²¹ (resurrection) نشورا

c'. /fari:qa:n/²³ (two teams) فريقا

In the data analyzed, vowel lengthening does not play a crucial role in the application of the four processes.

2.2.1.2.2 Diphthongization

Another observed change in vowels' quality is that of diphthongization where a single vowel becomes two vowels. Specifically, following pharyngeal or uvular (guttural) consonants, vowels tend to change their quality between rising and falling. Diphthongization in the LHQ is explained more in chapter three. Nevertheless, examples showing diphthongization in the LHQ are given in 9. below.

9. Diphthongization in LHQ

a. janħitu:n→janħe^Itu:n (rising diphthong) ينحتون

b. min ʔilm→min ʔr^olm (falling) من علم

c. janʔiq→janʔe^Iq (rising) ينعق

¹⁸ "ياخذون عرض هذا الأدنى ويقولون سيغفر لنا وإن ياتهم عرضٌ مثله يأخذوه" (الأعراف) (7:169)

¹⁹ "فلما رآوه عارضا مستقبل أوديتهم قالوا هذا عارضٌ ممطرنا" (الأحقاف) (46:24)

²⁰ "كذبت ثمود بالنذر" (القمر) (54: 23)

²¹ "ولا يملكون موتا ولا حياة ولا نشورا" (الفرقان) (25:3)

²² "فالفارقات فرقا" (المرسلات) (77:4)

²³ "فإذا هم فريقان يختصمون" (النمل) (27:45)

2.2.1.3 Nasality

Nasality seems to play a very essential role in the LHQ. The three patterns of *ʿidghām* (*gemination*), *ʿikhfāʾ* (*nasal place assimilation*) and *ʿiqḷāb* (*labial place assimilation*) all involve regressive nasalization from nasal *n* to a preceding vowel as in a., c. and d. In b. below- in gemination with nasalization- nasalization appears on the semivowel rather than the preceding vowel.

10. Nasality in LHQ processes

- a. *min niʿmah* → *mīn niʿmeh* (*ʿidghām*) من نعمة
- b. *man juṭiʿ ʔaḷḷah* → *mΛj̣ juṭiʿ ʔḷah* (*ʿidghām*) من يطع الله
- c. *dʒabbaran ʃaqija* → *dʒabbarēn ʃaqijə* (*ʿikhfāʾ*) جبارا شقيا
- d. *ʔanba:ʔ* → *ʔāmba:ʔ* (*ʿiqḷāb*) أنباء

In *ʿiqḷāb* (*nasal place assimilation*), nasality is of significance as nasal *n* changes into nasal *m* (*junbit* → *jūmbit*) and not an obstruent like *f* or *v* or another sonorant like *w* or *ṡ*, for example. In addition, the vowel preceding nasal *n* becomes nasalized as a result of *labial place assimilation*. In the case of the guttural pattern, the nasality of *n* is retained as no phonological changes like nasal deletion, regressive nasalization or *nasal place assimilation* affect nasal *n* (*kullun ʔa:man* → *kullun ʔa:mən*).

Next, I turn to *Tajwīd* and review the different ways of conventional recitation. Then, I try to give a full descriptive account of the nasal processes examined.

2.2.2 Tajwīd and Language

2.2.2.1 Different ways of reciting Qur'an

The Qur'an can be recited in one of four ways: *taḥqīq*, *tartīl*, *ḥadr* and *tadwīr*. The difference between these ways is one of tempo/speed, in keeping with the rules of *Tajwīd*.

In *taḥqīq*, the reciter recites the Qur'an very slowly and carefully, enunciating every phoneme with its full sound values or features and taking the longest durations possible as Gouda (1988) puts it. For instance, the reciter articulates long vowels with their full length ('ishbā' 'al-madd), pronounces the glottal stop very carefully and clearly (*taḥqīq* 'al-hamzah). He/she respects rules of articulating vowels (giving them their full utterance; 'itmām 'al-ḥarakāt) and consonants (respecting singletons and doubled consonants; 'itmām 'al-'iẓhār wa t-tashdīd). This method of recitation is mainly used for practice and learning the Qur'an.

Tartīl is the ideal method of recitation with which God commanded- as Muslims believe- the prophet and Muslims to recite the Qur'an (*wa-rattil 'al-qur'ān^a tartīl*) "chant the recitation in measured, clear chant". This way is not to be confused with *taḥqīq* since the latter is for practice and learning while *Tarteel*, on the other hand, is for pondering, "contemplating, thinking and discovering the profundity" (Gouda 1988, p.96). In short, as *Tajwīd* practitioners say "every *taḥqīq* is *tartīl*, but not every *tartīl* is *taḥqīq* (Gouda 1988, p. 96).

As for *ḥadr*, the reciter applies a speedy mode of recitation by taking the shortest durations, assimilating phonemes, deleting and shortening when possible. This technique is very feasible for making recitation easier and is most of the time used when one recites to oneself.

Finally, in *tadwīr*, the reciter follows a midway pattern between *taḥqīq* and *ḥadr*; i.e., neither a hurried mode of recitation nor slow and careful. Tadweer is used for teaching purposes and has been applied by Shaykh al-Husari (who is one of the leading modern reciters of Qur'an) when recording the whole Holy Qur'an (Gouda, 1988).

2.2.2.2 Patterns of nasal n in the Language of the Holy Qur'an

Although I have already introduced the four patterns of *'idghām*, *'ikhfā'*, *'iqlāb* and *'izhār*, it seems important to illustrate and summarize each one of them and to add necessary details before proceeding with any analysis.

2.2.2.2.1 *'idghām* (gemination)

This processes involves the assimilation of nasal n to a following sonorant yielding a geminate. Arabs learn the sounds of *'idghām* by memorizing the root consonants of the verb {jərmilun²⁴; يرملون} which roughly means *to do something with sand*.

Two types of *'idghām* are realized: total (complete) and partial (incomplete). Total gemination takes place when the /n/ is followed by liquids (/l/, or /r/) where no nasalization of the preceding vowel is maintained as in *min_riba:t̤ ʔalɤajl→mɪr_riba:t̤¹lɤajl* and *fasalamun_lak→fəsalamuɫ_lək*. On the other hand, partial

²⁴ The semivowel w is an equivalent to {u} in the word {jərmilun} in Arabic.

gemination occurs when nasalization (/ɛunnah/; غنة) is involved, either on the preceding vowel when nasals (/n/or /m/) follow the n (e.g., *hiṭṭatun naḵfir*→*hiṭṭaṭūn naḵfir* and *min ma:l ʔaḷḷah*→*mīm ma:lilah*) or on semivowels when they come after the nasal (e.g., *χajrun wa ʔabqa*→*χajruw̃w̃ə ʔəbqə* and *man juṭiʔilah*→*maḷj̃juṭiʔilah*).

Arabs know the sounds of gemination with nasalization by memorizing the verb /*janmu*/; ينمو. Gouda (1988) justifies the fact that semivowels carry nasality rather than the preceding vowel based on their voicing quality. This is certainly not a strong reasoning since all the other sonorants including liquids are underspecified as being voiced. Later, he gives another account by arguing that the nasality of the n “resembles the sonority {*l̥m*} and lengthening {*madd*} that feature /y/ and /w/” (p. 198) and hence carry nasality which makes the assimilation of n partial. This is not a satisfactory answer either since liquids are more similar to nasals but still they do not get nasalization. A logical reasoning would be to say that glides are semivowels (i.e., behave like vowels) and hence become nasalized just in the same way vowels become nasalized.

ʾidghām (total or partial) always occurs at word boundaries. Four words are pointed out in the LHQ where nasal n is followed by sonorants word medially but still ʾidghām underapplies²⁵. Instead of assimilating, they are pronounced with **absolute** ʾizhār (*zero nasal assimilation*) /اظهار مطلق/. These are /*šinwa:n*/, /*dunja*/, /*bunja:n*/ and /*qinwa:n*/. The reason given by almost all *Tajwīd* practitioners for not assimilating

²⁵ Underapplication is a term that refers to when a rule fails to apply even when the environment for it is met. Its opposite is overapplication; application of a rule without meeting its conditioning environment.

these words is to avoid mixing them with doubled nouns and to guard against losing meaning by deleting one of the radicals (Abdullah (no date), al-Qanoobi (2002), Nasr (1994)). The noun /ʃinwa:n/ (one of a pair or of more than two) would change to /ʃiwwa:n/ which has a totally different meaning (echo). This line of reasoning does not offer a satisfactory solution for the two nouns /dunjə/ and /bunjan/ which would be expected to change to /dujja/ and /bujjan/ respectively. These nouns are meaningless unless we think of the meaning of the root consonants /djj/ as in (/dajj/; hand) and /bjj/ as in (/bjj/; an expression meaning “God keep you. God help you”) (Hava, J. (1964)).

Some other structures that reject gemination are what is known as 'al-ḥurūf 'al-muqatta'ah (separated letters); words that are pronounced letter by letter. Examples of these are given in 11.

11. 'al-ḥurūf 'al-muqatta'ah in LHQ

- a. ja:si:n walqurrʔa:n→ja:si:n wəlqurrʔan يس والقرآن
b. nu:n wal qalam→nu:n wal qalam ن والقلم

It is possible, however, to enunciate these verses with *'idghām with nasalization* according to 'āsim riwāyah or qirā'ah (al-Qanoobi 2002). It is important to note that **absolute** 'iẓhār is not attested within 'al-ḥurūf 'al-muqatta'ah such as in ʔa:' si:n mi:m→ʔa:' si:m mi:m as *'idghām (gemination with nasalization)* is what applies in this case. *Tajwīd* scholars argue that this happens due to the fact that the n in /si:n/ is a part of the

word and we cannot pause immediately after it; which would result in *ʾizhār* (zero nasal assimilation) (Nasr 1994).

Examples illustrating *ʾidghām* (gemination with/without nasalization) are listed in appendix 2. and some are reproduced in 12.

12. *ʾidghām with nasalization; /ʔidɣɑ:m bɪɣunnəh/* (إدغام بقنة)

1. wabarqun_jadɣʔalu:n → wəbərquɟ_ɟədɣʔalu:n وبرق يجعلون
2. ɣajrun_wa ʔabqa → ɣajruw̃_wə ʔəbqə خير وأبقى
3. ʔamʃa:dɣin_nabtali:h → ʔəmʃadɣin_nabtali:h أمشاج نبتليه
4. ʔala kull ʃajʔin_muqtadira → ʔalə kulʔ ʃajʔim_muqtadire
على كل شيء مقتدرا

ʾidghām without nasalization; /ʔidɣɑ:m bɪdun ɣunnəh/ (إدغام بدون غنة)

1. raḥi:mun_wadud → raḥimuw̃_wadud رحيم ودود
2. ʔiʃatin_ra:ɖijah → ʔiʃatir_ra:ɖijəh عيشة راضيه

2.2.2.2.2 *ʾizhār* (zero nasal assimilation)

In *ʾizhār*, nasal n does not assimilate to the following sound in any respect (neither place nor manner) and retains a neutral position when followed by one of the six guttural sounds; uvulars /χ, ʁ/, pharyngeals /ħ, ʕ/ and laryngeals /h, ʔ/. *Tajwīd* learners know them by taking the first sound of every word of the following Arabic stanza, “أخي هاك علما “ (ʔΛχi: həkə ʔilm^{ən} ḥa:zahu ʁajr^u χa:sɪr). Gouda (1988) names *ʾizhār* as “distinct pronunciation” and describes the n as being “fully and clearly realized, and produced from its original outlet with all its specific characteristics and properties manifested” (p. 195).

This pattern occurs within the same word (medial position) or across word boundaries (in junctural position) as exemplified below in 13.

13. 'izhār within the same word

1. walmunxaniqah→walmunxanirqəh والمنخقه
2. fasajaŋ idu:n→fəsajəŋeⁱdu:n فسينغزون
3. wanhar→wanhər وانحر
4. janʔiq→janʔeⁱq ينق
5. ʔalʔanha:r→ʔəlʔənh:a:r الأنهار
6. minhum→minhum منهم

'izhār across word boundaries

1. minxawf→minxawf من خوف
2. minʔisli:n→minʔisli:n من غسلي
3. manha:dʔallah→manha:d^əʔallah من حاد الله
4. sabʔunʔidza:f→sabʔunʔidza:f سبع عجاف
5. qawminha:d→qawminha:d قوم هاد
6. ʔurubanʔatra:ba→ʔurubənʔətra:be عربا أترابا

2.2.2.2.3 'ikhfā' (nasal place assimilation)

In this process, nasal n is pronounced in a midway between 'idghām and 'izhār.

According to Gouda (1988) 'ikhfā' is made when, "the tongue does not quite touch the alveolar ridge, and the vocal cavity holding the shape of the preceding vowel and the total sound articulated through the nasal cavity" (p. 199). A possible controversy here is that, under 'ikhfā', the duration of the nasal stop shortens (*timing becomes short*), the following consonant becomes prenasalized and the preceding vowel of the nasal becomes nasalized. Unfortunately, due to time constraint and shortage of necessary apparatus, an acoustic experiment could not be conducted to check whether nasal n disappears totally and to measure the nasality and length of the preceding vowel. Hence, I have to agree- for the time being- with Gouda regarding his description of phonetic description of 'ikhfā'.

Fifteen obstruent sounds trigger 'ikhfā' which are /t/, /θ/, /dʒ/, /d/, /ð/, /z/, /s/, /ʃ/, /ʒ/, /d̪/, /t̪/, /ð̪/, /f/, /q/ and /k/. *Tajwīd* learners know them by taking the first letter of the following stanza; /ʃif ða θanə kam dʒa:də ʃaxs^{un} qad samə dum ʔajjib^{ən} zid fi tuqə dəf ða:lime/ (صف ذا ثنا كم جاد شخص قد سما دم طيبا زد في تقى ضع ظالما).

Siibawaih ('alkitab: II, p. 413-414) as cited in Gouda (1988) regards the n which has undergone 'ikhfā' as an allophone (nūn far'iyah) and Gouda agrees with him and adds that we actually have five allophones depending on the place of the following sound (i.e., homorganic allophones). Adding the labio-velar nasal allophone /w̃/ which is realized after an /f/, we can numerate six allophones of nasal n in the process of 'ikhfā' as given in 14. below.

14. Allophones of nasal n in *nasal place assimilation*

1. [ŋ] before velar sounds (/k/)

- a. ʁawwanun kafu:r → ʁawwanūŋ kafu:r خوان كفور

2. [ɲ] before palatals (/ʃ/ and /dʒ/)

- a. rasu:lan ʃa:hidan → rasu:lāɲ ʃa:hidən رسولاً شاهدا
b. dʒanna:tin tadʒri: → dʒanna:tīɲ tadʒri: جنات تجري

3. [n] before interdental and denti-alveolars (/t/, /t̪/, /d/, /d̪/, /s/, /ʃ/, /z/)

- a. min taḥtiha → mīn taḥtiḥə من تحتها
b. min ti:n → mīn ti:n من طين
c. ʔanda:da → ʔēnda:də أندادا
d. manḍu:d → mānḍud منضود
e. nansax → nēnsax ننسخ
f. manṣu:ra → mānṣu:rə منشورا
g. ʔanzalna:hu → ʔēnzalna:hu أنزلناه

4. [ɳ] before dentals (/θ/, /ð/ and /ð̪/)

- a. $\text{man}\theta\text{u:ra} \rightarrow \text{m}\tilde{\text{a}}\eta\theta\text{ur}\theta$ منثورا
 b. $\text{sira:}\text{ʔa}\eta\text{ðalik} \rightarrow \text{sira:}\text{ʔ}\tilde{\text{a}}\eta\text{ðalik}$ سراحا ذلك
 c. $\text{ʔun}\theta\text{uru} \rightarrow \text{ʔ}\tilde{\text{u}}\eta\theta\text{uru}$ انظروا

5. [w̃] before labio-dentals (/f/)

- a. $\text{wa}\text{ʔin}\text{fa:takum} \rightarrow \text{w}\theta\text{ʔi}\tilde{\text{w}}\text{fa:təkum}$ وإن فانكم

6. [ŋ] before uvulars (/q/)

- a. $\text{wala}\text{ʔin}\text{qult} \rightarrow \text{w}\theta\text{la}\text{ʔi}\tilde{\text{n}}\text{qult}$ ولئن قلت

An important remark to be made is that when nasal *n* is followed by the labio-dental fricative /f/, a nasalized labio-velar approximant is perceived in pronunciation and not a labio-dental nasal /m/ as Gouda (1988) represents it. The occurrence of the labio-velar allophone is sustained by the fact that fricatives have stricture features like continuancy which are similar to those of approximants (like glides) (Padget 1994 and 1995, Czaykowska-Higgins 1993).

Like *Gemination with nasalization* and *labial place assimilation* (as we will see in the next section), the vowels preceding nasal *n* become nasalized under the effect of both processes. We turn now to *ʔiqlāb* (*labial place assimilation*).

2.2.2.2.4 ʔiqlāb (*labial place assimilation*)

In *ʔiqlāb*, nasal *n* deletes and is substituted by the bilabial nasal /m/ which is similar to the place of the following voiced bilabial stop /b/. In addition, the preceding vowel becomes nasalized under *labial place assimilation*. *ʔiqlāb* occurs in medial or in junctural position as represented in 15.

15. ʔiqlāb (*labial place articulation*) within the same word

1. $\text{ʔa}\text{nb}\text{i}\text{ʔu:ni} \rightarrow \text{ʔ}\theta\text{mb}\text{i}\text{ʔuni}$ أنبئوني

2. lajunbaðanna → ləjũmbaðəne لينجن

3. ʔanba:ʔ → ʔāmba:ʔ أنباء

ʔqlāb (*labial place articulation*) across word boundaries

1. ʔan bu:rik → ʔām bu:rik أن بورك

2. min baʔd → mīm baʔd من بعد

3. maʃʃa:ʔin binami:m → maʃʃaʔīm binami:m مشاء بنميم

2.2.3 ʔikhfāʔ vs. ʔqlāb

Arab grammarians have long perceived that the two processes of ʔikhfāʔ and ʔqlāb are distinct and hence gave them different labels. We could look at the difference between the two processes as that of *structure preservation*²⁶ where this term is used here to denote the similarity in phonemic information between the input and output. In ʔikhfāʔ (*nasal place assimilation*), the input and the output are not the same since six allophones of nasal n are produced depending on the place of the following obstruent as discussed above. Hence, ʔikhfāʔ does not respect *structure preservation*. If we consider ʔqlāb as not being different from ʔikhfāʔ; then what we are actually assuming- according to *structure preservation*- is that the resultant nasal m in ʔqlāb is one of the surface allophones of ʔikhfāʔ (a new output). On the other hand, if we view ʔqlāb as being different, then the resulting nasal m is a separate phoneme (another input in the language); i.e., *structure preservation* is satisfied.

Another point is that the difference between the two could be phonetic in nature and based on closure timing (Steriade 1993) between the nasal and a following obstruent

²⁶ Structure preservation is defined by Crystal (2003) as “a principle in lexical phonology which states that constraints on possible underlying segments in the inventory of a language, and constraints on Autosegmental associations, hold throughout the derivation during the lexical part of the phonology. These constraints are dropped during the post-lexical part of phonology.”

in both processes. As a result, we would expect to have a prenasalized obstruent in the case of *'ikhfā'* since nasal *n* is not fully realized as a nasal stop. As to *'iqḷāb*, nothing more could be said about it except that the *n* deletes and is changed to an *m* which is homorganic to the following obstruent */b/*. At any rate, the difference in closure timing of the nasal and the following obstruent is difficult- if not impossible- to be measured acoustically. Thus, I relax the latter idea and follow Siibawaih (*al-Kitaab:II*, p. 413-414) and Gouda (1988) in assuming that the *n* is altered into allophones homorganic to the following obstruents in *'ikhfā'* and that *'ikhfā'* and *'iqḷāb* are different.

2.3 Summary of chapter two

This chapter is intended to be as a transition between chapter one and chapters three and four since it describes some linguistic aspects about the LHQ such as its sound inventory and how its tradition of recitation relates to language. The chapter is concluded by discussing the different phonological patterns of nasal *n* before they are analyzed in chapters three and four.

Chapter 3

The Language of the Holy Qur'an and natural sound classes

3.1 Introduction

It has been demonstrated in previous chapters that the language of the Holy Qur'an (LHQ) distributes its consonantal inventory among three classes of sounds depending on the four patterns of nasal *n* which involve 'idghām (*gemination with/out nasalization*), 'ikhfā' (*nasal place vocalization*), 'iqlāb (*labial place assimilation*) and 'izhār (*zero nasal assimilation*). *Gemination* affects *sonorants* as in 1.a. whereas *nasal place assimilation* targets all *obstruents* except the *voiced bilabial stop* /b/ (see 1.b.) which is the focus of *labial place assimilation* (as in c.). Finally, *zero nasal assimilation* affects *gutturals* as in 1.d.

1. Process of nasal *n* in the LHQ

- | | | |
|--------------------------------------------------------|----------|-----------|
| a. /raʔu:fu <u>n</u> rahi:m/→[raʔu:fu <u>r</u> rahi:m] | رؤف رحم | ('idghām) |
| b. /mun <u>ḍ</u> ir/→[mū <u>ṇ</u> ḍir] | منذر | ('ikhfā') |
| c. /ʔa <u>n</u> ba:ʔ/→ [ʔā <u>m</u> ba:ʔ] | أنباء | ('iqlāb) |
| d. /ʔali:mun <u>x</u> abi:r/→[ʔali:mun <u>ḡ</u> abi:r] | عليم خير | ('izhār) |

This chapter addresses the question of what the four changes of nasal *n* reflect about natural sound classes in the phonology of the LHQ? Gussenhoven and Jacobs (1998, p. 175) define the term **natural segment/sound class** as “any group of segments referred to by a process” and **natural feature class** as “a group of features that is manipulated (i.e., transferred, deleted or inserted) by some phonological process.” (ibid)

3.2 The natural sound classes of the LHQ

The changes of nasal /n/ in the LHQ are triggered specific classes of sounds, as will be demonstrated below. Of the four patterns of nasal n, 'izhār seems to violate a clear-cut distinction between the two classes of sonorants and obstruents. Section 3.2.2. discusses the crosscutting effect of gutturals to sonorants and obstruents.

3.2.1. Sonorants and Obstruents in the LHQ

3.2.1.1. 'idghām

The process of 'idghām (*gemination with/out nasalization* or) involves sonorants as its focus. Sonorants include the two nasals /n/ and /m/, the two liquids /l/ and /r/ and the two glides /j/ and /w/ but not pharyngeals. Two examples showing *gemination with and without nasalization* respectively are a. and b. in 2.

2. a. /min wa:l/ → [mɪw̃w̃a:l] من وال
 b. /min rabbihiṃ/ → [mɪr rabihiṃ] من ربيهم

No dialect in Arabic has been cited to show this kind of assimilation or relation with nasal n. The only similar example comes from the Semitic languages of Eastern Gurage cited in Hetzron (1969) (see 3.) where nasal n is expected to appear but gets blocked when occurring in the context of sonorants; when a sonorant is the second radical of a root (p.76-77). No gemination is rendered as a result of the nasal's absence, however.

3. Nasal n absence in the environment of sonorants in Eastern Gurage languages

- 'ashes' *ḥmd, S.W.Z.²⁷ amäd (mid radical m)
- 'to strangle' *xnq, S.W.Z. anäqä, E hanäqä. (radical n)
- 'to be naked' *ʔrz, Z. t-aräzä, and S. iraz, W.Z. eraz 'hide of an animal serving to cover nakedness' (LESLAU 32) (radical r)

²⁷ S., W., Z., and E are abbreviations for Səlt'i, Wäläne and Zway and Ənnäqor.

3.2.1.2. 'ikhfā'

The majority of obstruents in the LHQ undergo 'ikhfā' (*nasal place assimilation*) as shown in 4. This includes the set of /t/, /θ/, /dʒ/, /d/, /ð/, /z/, /s/, /ʃ/, /ʂ/, /d̪/, /t̪/, /ð̪/, /f/, /q/ and /k/; plosives /t/, /d/, /t̪/, /d̪/, /k/ and /q/, fricatives /f/, /θ/, /ð/, /ð̪/, /s/, /ʃ/, /z/ and /ʒ/, and affricates like /dʒ/.

4. The class of obstruents in the LHQ participating in 'ikhfā'

- a. jantahu: → jēntahu: يتها
- b. fa ʔamma man θaqlat → fə ʔamma māñ θaqlət فاما من هلت
- c. ʃajʔan dʒadala → ʃajʔāñ dʒadələ شينا جدلا
- d. qinwa:nun da:nijah → qinwa:nūñ danijəh قنوان دانية
- e. jawmin ði: → jawmīñ ði: يذ موي
- f. nafsanzakijah → nafsāñ zakijəh نفسا زكية
- g. baʃaran sawija → baʃarāñ sawijə بشرا سويا
- h. dʒabbaran ʃaqija → dʒabbarēñ ʃaqijə ايقش ارابج
- i. min ʂalʂa:l → mīñ ʂelʂa:l من صلصال
- j. min ɖari:ʔ → mīñ ɖari:ʔ من ضريع
- k. min ɬajjiba:t → mīñ ɬajjiba:t من طبيبات
- l. min ɖahi:r → mīñ ɖahi:r من ظهير
- m. min faɖal ʔaɭlah → mīw fədəlilah من فضل الله
- n. walaʔin qult → wəlaʔīñ qult ولئن قلت
- o. kira:man ka:tibi:n → kīramēñ ka:tibi:n كراما كاتبين

A similar behaviour of nasal n assimilation to the following obstruent is found in Sudanese Arabic (Hamid 1984). The examples are given in 5.

5. Sudanese nasal place assimilation

perfect	imperfect	glossary
a. nafad	ya-ɲfid	'save'
b. nazal	ya-nzil	'descend'
c. nasaf	ya-nsif	'demolish'

d. naʃar	ya-ñʃur ²⁸	‘spread’
e. nadʒaħ	ya-ñdʒaħ	‘succeed’
f. nakar	ya-ŋkur	‘deny’
g. naxar	ya-ŋxar	‘puncture’
h. nagal	ya-ŋgul	‘transfer’

3.2.1.3 ʾiqlāb

One oral obstruent does not participate in *nasal place assimilation* like the other obstruents; /b/. The voiced bilabial stop /b/ turns a nasal n into an /m/ when they occur in the same word as in 6.1. or across word boundaries 6.2. in a process called ʾiqlāb (*labial place assimilation*).

6. The voiced bilabial stop /b/

- a. ʔanbatat → ʔāmbatət انتبت
b. min baʿdih → mīm baʿdirh من بعده

A similar phenomenon to ʾiqlāb is observed in Sudanese Arabic (Hamid 1984). The example given is nabaħ → ya-mbaħ ‘bark’.

3.2.2 Gutturals (ʾalḥurūf ʾalḥalqiyah /ʔAlḥuru:f ʔAlɖawfiʒəh/ʔAlḥalqiʒəh/)

Gutturals- especially the two pharyngeals /ħ/ and /ʕ/- are particularly associated with Arabic. They have been considered as a natural class for a long time in the literature by researchers like McCarthy (1994), Rose (1996), Hayward and Hayward (1989), Herzallah (1990) and many others. A guttural class in the LHQ includes six sounds which can be broken down into the two pharyngeals /ħ/ and /ʕ/, laryngeals /h/ and /ʔ/ and

²⁸ The transcription shown is what is used in Kenstowicz (1994)

uvulars /χ/ and /ʁ/. Emphatics²⁹, however, are not included in the guttural class in the LHQ, where a sequence of a nasal n and a guttural sound occurring in the same word or across word boundaries is referred to as *ʾiẓhār* or *zero nasal assimilation* (The latter term is mine).

3.2.2.1 Gutturals as a natural class

This section presents evidence for the claim that gutturals form a natural class in the LHQ. First, they don't participate in the assimilation of nasal n like the other consonantal sounds of LHQ do. Gutturals in almost all Arabic dialects to my knowledge don't undergo assimilation (but they can be contrasted to other classes of sounds like sonorants and obstruents as is the case in LHQ).

Second, gutturals don't co-occur in the same root, which is a general phenomenon in both Arabic and the LHQ. A word like *ʔamba : ʔihə* seems to have more than one guttural in the surface form. The root of it (nbʔ), however, has only one guttural whereas the *ʔa* part preceding the root is a plural marker. Other effects of gutturals lie in their tendency to lower the vowels following them, in creating diphthongs and in crosscutting the sonorant and obstruent classes. The following subsections illustrate examples of each of the gutturals' characteristics.

3.2.2.1 *ʾiẓhār*

Gutturals do not undergo assimilation, as they do not cause any sort of assimilation to nasal n when it precedes them. This is reflected in 7. below (a. through f.) (see appendix 2 for more).

²⁹ These are sounds produced with a secondary place of articulation and are all coronals. These include /d/, /t/, /ð/ and /s/.

7. No nasal assimilation before gutturals

- a. wanħer → wanħer وانحر
 b. min ʕamil → min ʕamil من عامل
 c. min χawf → min χawf من خوف
 d. min ʕil → min ʕil من غل
 e. man ha:dʒer → man ha:dʒer من هاجر
 f. man ʔaʕtə → man ʔaʕtə من أعطى

The only Arabic dialect³⁰ cited in the literature to have a similar phenomenon is Sudanese Arabic (Hamid 1984 in Kenstowicz 1994) where nasal n remains unchanged only before the pharyngeals /ħ/ and /ʕ/ and the laryngeal /h/. On the other hand, the velar sound /x/ which might be considered as an equivalent sound to the LHQ's uvular /χ/ causes nasal n to become a velar nasal /ŋ/. This latter treatment of nasal n in Sudanese reminds us of 'ikhfa' in the LHQ, where n assimilates to the place of articulation of the following obstruent. The assimilation of nasal n when preceding the velar sound /x/ in Sudanese Arabic (SA) is exemplified in *naxar* → *ya-ŋkur* (puncture).

Neither Hamid nor Kenstowicz mention the status of nasal n when followed by the laryngeal /ʔ/ or the uvular /ʕ/ in SA; however, my prediction is that they pattern with the other gutturals just like in the LHQ. In 8. below, I excerpt the examples Kenstowicz (1994) uses when analyzing SA nasal n data, which he himself borrows from Hamid (1984).

8. Sudanese nasal n assimilation in Kenstowicz (1994, p.158)

<u>perfect</u>	<u>imperfect</u>	<u>glossary</u>
g. <i>naxar</i>	<i>ya-ŋxar</i>	'puncture'
h. <i>nagal</i>	<i>ya-ŋgul</i>	'transfer'
i. <i>naħar</i>	<i>ya-nħar</i>	'slaughter'

³⁰ As was mentioned before in this work, no Arabic dialect assimilates nasal n to a following guttural sound except when the sound / χ ʕ / is treated as velar and not a uvular.

j. nifis	ya-nfas	'fall asleep'
k. nahab	ya-nhab	'rob'

One might wonder why the uvular stop /q/ does not behave like the other two uvulars in the LHQ; /χ/ and /ʁ/. It is striking that the /q/ in the LHQ patterns with emphatics in the process of *ikhfa'* (*nasal place assimilation*) and causes nasal n to assimilate to its place of articulation. This behaviour of /q/ is not surprising if we learn that in some Semitic languages it behaves like the other emphatics in Arabic and the LHQ. The example Zawaydeh provides is that of emphatics in Ethiopian languages where they surface as ejectives" (1999, p. 36). Consequently, /ṭ/ is realized as [t'], /ṣ/ as [s'], and /q/ as [k'].

Moreover, Zawaydeh narrates provides other examples from Hebrew where Tur-Sinai (1973), as cited in Laufer and Baer (1988), thinks that the emphatic /ṭ/ is a "[t] combined with swallowing" just in the same way that /q/ is a "[k] with swallowing" (p. 12).

3.2.2.2 Root co-occurrence restrictions on Gutturals

Another piece of evidence for the natural class grouping of gutturals in the LHQ comes from root co-occurrence restrictions. This is a general phenomenon from Arabic (McCarthy 1991 and 1994) and is also found in the LHQ. Greenberg (1950) cited in McCarthy (1991) states that Arabic has a strong tendency to prohibit roots containing two gutturals (identical or not). This is illustrated in the examples in Appendix 2. At the surface level, words could contain two or even more gutturals within one word as in /ʔəʕraḍ/; however, the root /ʕrḍ/ has only one guttural in this particular example,

whereas the first part ʔə is a past tense marker. The last example /ʔrɔ/ (to show) also shows that emphatics are not included in the class of gutturals in the LHQ because we could have a root with a pharyngeal, for example, and an emphatic. Other examples where emphatics and the uvular stop /q/ co-occur with pharyngeals are like /qħt/ (to become barren) and /qʔʕ/ (to cut).

Other places of articulation in both Arabic and the LHQ also have co-occurrence restrictions. Greenberg (1950) cites that in Arabic (and in Semitic in general) triliteral verbs, the first and second positions cannot be filled by two homorganic consonants like *bm-* or identical consonants as in **mmd* (Greenberg, 1950) since they share the labial place of articulation. Positions two and three also disfavor homorganic consonants as in **ʃkg* but not identical ones (**ʃkk* 'to split'). Finally, in positions one and three, homorganicity and/or identity of consonants is still marked but not in the same degree as in other combinations of positions. For instance, Arabic allows a root verb like *qlq* with identical first and last consonants.

The phenomenon of guttural root co-occurrence restrictions can be accounted for by the universal principle of the OCP (McCarthy 1985 and 1991). The wording of the OCP is given in 4.1.

4. Principles explaining root co-occurrence restrictions of gutturals

1. *Obligatory Contour Principle* (OCP) (Leben 1963; Goldsmith 1976)

Adjacent identical elements are prohibited

According to the OCP, no more than two sounds having the feature [pharyngeal] should occur in the same root. McCarthy (1991) justifies this restriction by maintaining

that “all instances of [pharyngeal] within a root are adjacent on some Autosegmental tier, whether the root consonants α and β are adjacent or not” (p. 67).

3.2.2.3 Vowel lowering

Most gutturals in the LHQ (pharyngeals and uvulars) lower the vowels following them. Examples 5.a through c. show this phenomenon at work. Laryngeals do not, however, participate like the other guttural members in this phenomenon. In all the examples in 6, /ʔ/ and /h/ do not trigger any lowering/tensing of the vowels following them. In 6.c-e, the vowel following the laryngeal /ʔ/ is lowered because there is either a pharyngeal /ħ/ or /ʕ/ – 6.c and d. respectively – or an emphatic /ð/ following the lowered vowel.

5. Gutturals lowering effects

- a. $\text{min } \underline{\text{ɛ}}\text{il} \rightarrow \text{min } \underline{\text{ɛ}}\text{ɪl}$ من غل
- b. $\text{min } \underline{\text{ʔ}}\text{ajn} \rightarrow \text{min } \underline{\text{ʔ}}\text{ajɪn}$ من عين
- c. $\text{min } \underline{\text{ħ}}\text{asanah} \rightarrow \text{min } \underline{\text{ħ}}\text{asanəh}$ من حسنة
- d. $\text{min } \underline{\text{x}}\text{a:liqin } \underline{\text{ɛ}}\text{ajru } \underline{\text{ʔ}}\text{al} \underline{\text{ħ}}\text{ah} \rightarrow \text{min } \underline{\text{x}}\text{a:liqin } \underline{\text{ɛ}}\text{ajru } \underline{\text{ʔ}}\text{al} \underline{\text{ħ}}\text{ah}$ من خالق غير الله

6. Laryngeals and vowel lowering

- a. $\text{jan } \underline{\text{ʔ}}\text{awn} \rightarrow \text{jan } \underline{\text{ʔ}}\text{awɪn}$ يانون
- b. $\text{min } \underline{\text{ʔ}}\text{anba: } \underline{\text{ʔ}}\text{iħə} \rightarrow \text{min } \underline{\text{ʔ}}\text{anba: } \underline{\text{ʔ}}\text{iħə}$ من أنبائها
- c. $\text{man } \underline{\text{ʔ}}\text{aʕta} \rightarrow \text{man } \underline{\text{ʔ}}\text{aʕtə}$ من أعطى
- d. $\text{min } \underline{\text{ʔ}}\text{ahad} \rightarrow \text{min } \underline{\text{ʔ}}\text{ahəd}$ من أحد
- e. $\text{waman } \underline{\text{ʔ}}\text{aðlam} \rightarrow \text{wəməɪn } \underline{\text{ʔ}}\text{aðləm}$ ومن أظلم
- f. $\underline{\text{ʔ}}\text{in } \underline{\text{h}}\text{uwa} \rightarrow \underline{\text{ʔ}}\text{in } \underline{\text{h}}\text{uwə}$ إن هو
- g. $\text{fari:qan } \underline{\text{h}}\text{ada} \rightarrow \text{fari:qən } \underline{\text{h}}\text{adə}$ فريقا هدى

Bani-Hassan Arabic, a Jordanian Bedouin dialect (McCarthy 1991, originally from Irshied and Kenstowicz 1984, p. 119) is an example of how gutturals lower the

vowels in their contexts. A process of raising α to i in an open syllable is active only when the vowel is followed by any other sound but a guttural which blocks it. See the examples in 7.

7. Non-guttural Roots

balas/blisat “he/she denounced”

Guttural Roots

saḥab/shābat “he/she pulled”

daʿam/dʿamat “he/she supported”

balaʿ/blaʿat “he/she swallowed”

dibaʿ/dbaʿat “he/she dyed”

In 7., all the forms are CaCaC underlyingly, with the suffix *at* in the second column indicating 3FS. The process of raising affects only the second vowel *a*, as shown in the first column whereas the loss of the first vowel is due to a rule specific to all Bedouin dialects. McCarthy (1991) does not mention the effect of laryngeals in this particular process. My intuition – as an Arabic speaker of a Bedouin dialect (Masirah dialect of Omani Arabic) – is that laryngeals also block this rule of raising in Bani Hassan Arabic dialect since no examples are cited in the literature about their effect.

3.2.2.4 Diphthongization

Another observation of vowels in the context of gutturals in the LHQ is that following pharyngeal or uvular consonants (gutturals), monophthongal vowels become diphthongs (two vowels or a vowel+ a glide). Bessell (1992) reports a number of cases where diphthongs are created in the environment of true pharyngeals, uvulars and pharyngealized consonants (emphatics). To illustrate, in Egyptian Arabic, the vowels [i:] and [o:] gain a glide effect [i: + glide, o: + glide] when occurring with a pharyngeal consonant in the same root. An underlying [u:] in the same dialect also

acquires a glide effect and becomes extra short [ụ+ glide]. The third cardinal vowel [a:] does not behave like the other two previously discussed vowels in Egyptian Arabic, for it actually raises to [æ:, æ̣̂].

Another dialect of Arabic which Bessell shows to have diphthongization is Iraqi Arabic, where an underlying [i:] is either lowered to [əi] or raised to [iə] in the environment of an emphatic (a pharyngealized consonant). The LHQ exhibits a similar effect of both forming raising (8a. and b.) and lowering diphthongs (8c.). The case of the LHQ is, however, different than Egyptian and Iraqi Arabic in that the targeted vowels are not long (See the examples in 8. cf. Egyptian and Iraqi Arabic)

8. a. janhitu:n → janhe^ttu:n يَنْحِتُون
 b. janʕiɪq → janʕe^tq يَنْعَقُ
 c. min ʕilm → min ʕiɪlm مِنْ عِلْمٍ

3.2.2.5 Crosscutting of obstruent and sonorant classes

An observation that has not yet been made in the literature is that of the guttural sounds forming an independent class and crosscutting the obstruent and sonorant classes. The six members of this class can be divided as follows. The uvulars /χ/ and /ʁ/, the pharyngeal /ħ/ and the glottal /h/ are all fricatives while the glottal /ʔ/ is a plosive. This group of the four fricatives and the plosive makes up an obstruent class. The status of the remaining guttural sound varies according to dialects. Laufer and Condax (1981) as cited in Esling (1996) show that a stop closure in the epiglottal region could be identified when producing the Arabic and Hebrew pharyngeals; i.e., /ʕ/. Esling (1996 and 1999) is clear that /ʕ/ is possible (and that a stop occurs together with or instead of /ʕ/). On the other

hand, Butcher and Ahmed (1987) as mentioned in Esling (1996), report that it could be taken as an approximant /ʕ/ (underspecified for sonority) which is sometimes accompanied by a stop.

If the latter argumentation is taken as what really features the voiced pharyngeal in the LHQ, we could contend that gutturals in the LHQ form a class which interweaves both the obstruent and sonorant classes. This line of thought might make one wonder whether these facts tell us something about where the features [\pm son] and [\pm cons] are in Feature Geometry.

3.3 Interaction of Markedness and faithfulness constraints in the LHQ

This section discusses and motivates the faithfulness and markedness constraints used to analyze nasal n patterns in the LHQ.

3.3.1 Constraints used

A number of OT constraints (faithfulness and markedness) is used to account for the four patterns of the LHQ's data. This includes faithfulness constraints; **MAX- μ** , **Max-nasal**, **Ident-place** and **RM** and markedness constraints: ***Son. Gem.**, ***Obs. Gem.**, ***V_{ORAL}N**, *** \tilde{V}** , ***Nas. Liquid**, ***Phary. Gem.**, and *** \tilde{V} (N)?**. These constraints (faithfulness and markedness) are motivated and discussed below. It is important to note that the constraint **RM** does not refer to Realize Morpheme as Kurisu (2001) uses it but rather to Realize Meaning as will be elaborated in chapter four.

3.3.1.1 Faithfulness constraints

In the present analysis I treat the realization of the meaning of *sacredness* in the LHQ as a consequence of the interaction between faithfulness and markedness constraints. The basic ranking is one which has **RM** (Kurusu, 2001; output form of the

bare stem and output form of the generator are phonologically non-identical) outranking all faithfulness constraints except **Max- μ** (output Moras have output correspondents; Kager 1999). We will see below that **Max- μ** outranks **RM** and the other faithfulness constraints; i.e., **Max- μ >> RM >> Faith**, where faith refers to all other faithfulness constraints. This ranking typically conforms to the emergence of nonconcatenative morphology schema proposed by Kurisu (2002), which is shown in 13.

13. The Emergence of Nonconcatenative Morphology Schema

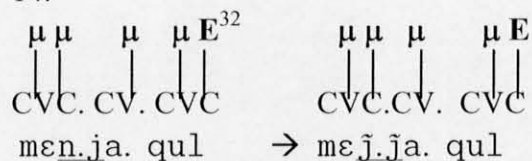
Faith $_{\alpha}$ >> RM >> Faith $_{\beta}$

In 13., faith is a variable referring to faithfulness constraints which are ranked high or low on the constraint hierarchy in respect to RM. According to Kurisu (2001), the subscripted α and β symbols refer to the morphosyntactic information underlyingly encoded. In the LHQ – as will be shown in chapter four –, the encoded information is not morphosyntactic in nature but is rather semantic and/ pragmatic. The schema in 13., illustrates what is referred to as the relativization of faithfulness constraints to the meaning expressed or realized, which is one of the conclusions made in the current study.

The faithfulness constraint **Max- μ** – which seems to be powerful in the LHQ – is motivated based on the fact that Arabic attaches a mora to the last consonant of a **CVC** syllable which is nasal n in our case. The representation below reflects this fact³¹.

³¹ It is important to note that the representation in 14. is not an input which lacks prosodic structure but is rather an output (which is the only reliable place for prosody).

14.



In all the four patterns of nasal *n* in the LHQ, the mora of nasal *n* is preserved. For instance, when the nasal (as a melody; content) is not deleted, it is always replaced by another segment – a sonorant (*Gemination*), an allophone (*nasal place assimilation*) or another nasal (*labial nasal assimilation*). This might be seen as a logical inference for the powerfulness of **Max-μ** which outranks all other faithfulness constraints including **RM** (output correspondents are not phonologically identical, Kurisu 2001), **Ident [place]** (output-output correspondents have identical place features, McCarthy and Prince 1995) and **Max [nasal]** (output feature [nasal] has its output correspondent, Zhang 2000) and **Ident- OO [nasal]** (output correspondents have identical values for [nasal]; Kager 1999). The ranking of **RM** and **Max [nasal]** in the LHQ in relation to **Max-μ** is represented in tableau 15.

Tableau 15.

$\text{min_raj}b_{(T)}^{33}$	Max-μ	RM	Max [nasal]
a. $\text{mir_raj}b$			*
b. $\text{min_raj}b$		*!	
c. $\text{mi_raj}b$	*!		*

Ranking **Max-μ** higher than **RM** is imposed by the pattern of *ʾiẓhār* (*zero nasal assimilation*) as shown in tableau 16. In the example in 16 below., we notice that **RM** has to be

³² The last consonant in an Arabic word is said to be extrametrical (E); i.e. is not parsed out when syllabification takes place. In other words, it is treated as an invisible segment when it comes to syllabification.

³³ The subscripted **T** stands for *Tajwid* and is attached to faithfulness constraints which are relativized to the meaning of *sacredness* which is being expressed or realized.

outranked by **Max- μ** because otherwise (i.e., if **RM** >> **Max- μ**) the intended or the optimal output janhawn will be eliminated by **RM**.

Tableau 16.

jan <u>h</u> awn _(T)	Max-μ	RM
a. janhawn		*
b. jã <u>h</u> awn	*!	

One more faithfulness constraint is used, namely **Ident OO (place)** (output-output correspondents have identical place features, McCarthy and Prince 1995) which is extended from **Ident IO (place)** (correspondents in input and output have identical place features, McCarthy and Prince 1995). This constraint is active in the two processes of 'ikhfā' (*nasal place assimilation*) and 'iqḷāb (labial place assimilation) where nasal n assimilates to the place of the following consonant. Like the other faithfulness constraints, **Ident IO (place)** is ranked lower than **Max- μ** and **RM** as illustrated in tableau 17. below.

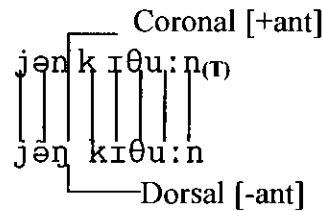
Tableau 17.

jə <u>n</u> kɪθu:n _(T)	Max-μ	RM	Ident [place]	Max [nasal]	Ident OO-[nasal]
a. jəŋkɪθu:n			*		*
b. jə <u>n</u> kɪθu:n		*!			
c. jə <u>ŋ</u> kɪθu:n	*!				*
d. jə <u>k</u> ɪθu:n				*!	

In 17., candidate a. jəŋkɪθu:n violates **Ident [place]** because the place feature of nasal n in the output form of the bare stem jənkɪθu:n_(T) which is [+ant] (being an alveolar coronal sound) is different from that of its velar correspondent /ŋ/ in a. jəŋkɪθu:n which is [-ant]. The

occurrence of **Ident [place]** lower than **RM** reflects that an alternation in place occurs in the process of 'ikhfā' which is illustrated in tableau 17. In chapter four, we will see that 'iqlāb (*labial place assimilation*) is triggered by the same ranking as in 'ikhfā' (*nasal place assimilation*). Figure 18. shows the correspondence relation between $j\theta n k \iota \theta u : n_{(T)}$ and candidate a. $j\tilde{\theta} \eta k \iota \theta u : n$ and the place features of nasal n in both.

Figure 18.



The faithfulness constraint **Ident-OO [nasal]** (output correspondents have identical values for [nasal]; Kager 1999) is active in all four patterns of nasal n. It is ranked the lowest in the constraint hierarchy, giving rise to nasalization on the preceding vowels to nasals in the three processes of 'idghām (*gemination with and without nasalization*), 'ikhfā' (*nasal place assimilation*) and 'iqlāb (*labial place assimilation*). An example showing this realization of nasalization is given in tableau 17. above where nasalization on the vowel /ə/ in $j\tilde{\theta} \eta k \iota \theta u : n$ is realized by the ranking **RM**>> **Ident-OO [nasal]**.

As to the pattern of 'izhār (*zero nasal assimilation*), no nasalization is realized on the vowel preceding nasal n because candidate b. $m\tilde{i}n _ \text{ʔ} a l \theta q$ is ruled out by another higher constraint, namely $*\tilde{V}(N)\text{ʔ}$ (see tableau 19. below). The latter markedness constraint is motivated in the next section.

Tableau 19.

$m\bar{u}n\ \bar{u}aləq_{(T)}$	$*\tilde{V}(N)\bar{u}$	Max- μ	RM	Ident-OO [nasal]
a. $m\bar{u}n\ \bar{u}aləq$			*	
b. $m\bar{u}n\ \bar{u}aləq$	*!			*
c. $m\bar{u}\ \bar{u}aləq$		*!		

Finally, the constraint **Max [nasal]** (output correspondents share feature [nasal] has its output correspondent, Zhang 2000) is illustrated in the process of *'idghām* (*gemination with or without nasalization*) which is triggered by the ranking **RM**>> ***Son. Gem., Max [nasal]** (tableau 20. and 21.).

Tableau 20. *'idghām juz'i* (*gemination with nasalization*)

$raḥim\bar{u}n\ wadud_{(T)}$	RM	*Son. Gem.	Max [nasal]
a. $raḥim\bar{u}n\ wadud$	*!		
b. $raḥim\bar{u}\tilde{w}\tilde{w}adud$		*	

Tableau 21. *ʔidghām Kulli (gemination without nasalization)*

$\text{ʔ}\Delta\text{n } \text{l}\Delta\text{n } \text{j}\text{a}q\text{d}\text{e}r_{(T)}$	*Nas Liquid ³⁴	RM	*Son Gem.	Max [nasal]
a. $\text{ʔ}\Delta\text{n } \text{l}\Delta\text{j } \text{j}\text{a}q\text{d}\text{e}r$	*!	*		
b. $\text{ʔ}\Delta\text{l } \text{l}\Delta\text{j } \text{j}\text{a}q\text{d}\text{e}r$			*	*

Next, I turn to how markedness constraints are active in the LHQ nasal patterns.

3.3.1.2 Markedness constraints

Two markedness constraints which outrank **RM** are *** $\tilde{V}(N)\text{ʔ}$** and ***Phary. Gem.** in the LHQ nasal data as shown in tableau 22. According to *** $\tilde{V}(N)\text{ʔ}$** , no sequence of a nasalized vowel or a nasalized vowel followed by a nasal and a guttural is allowed. Such a constraint is essential for the pattern of *ʔizhār* (*zero nasal assimilation*) in the LHQ nasal data as it prevents forms like candidate d. *jānhawn* from surfacing (tableau 22). The basic motivation for this constraint comes from an aerodynamic phenomenon known as **nasal leak** or **nasal airflow** (Curry 1910³⁵, Delattre 1951 and 1971, Zemlin 1968, Hetzron 1969). According to **nasal airflow**, the velum is lowered when a pharyngeal sound is produced making the latter sound acquire some nasal quality. I discuss this phenomenon more in the next section.

Tableau 22.

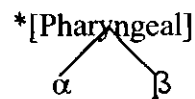
$\text{j}\text{a}n\text{h}\text{a}w\text{n}_{(T)}$	Max-μ	*$\tilde{V}(N)\text{ʔ}$	*Phary. Gem.	RM
a. $\text{ʔ}\text{j}\text{a}n\text{h}\text{a}w\text{n}$				*
b. <i>jāhawn</i>	*!			
c. <i>jahhawn</i>			*!	
d. <i>jānhawn</i>		*!		

³⁴ ***Nas Liquid** is motivated in the next section.

³⁵ This reference is not included in the bibliography of Ghazeli (1977) and was not found anywhere.

The constraint ***Phary. Gem.** – no geminate gutturals are allowed in the output – works to prevent candidates like c. jahhawn (tableau 22) from surfacing as the optimal output. This constraint is proposed in McCarthy (1986) where he argues for the root co-occurrence restrictions phenomenon on gutturals in Semitic including Arabic. See section 3.2.2.2 above for more elaboration on root co-occurrence restrictions on gutturals. According to the latter, roots are not allowed in Arabic to contain two gutturals (identical or not). An example of this is *ʕʕr. The *Anti-Spreading rule* (see 23. below) proposed by McCarthy (1991) motivates the constraint against surfacing of more than one segment with a pharyngeal feature [***Pharyngeal**]; i.e., including identical guttural segments sharing the same [**Pharyngeal**] feature.

23. *Anti-Spreading Rule* (McCarthy 1991)



According to McCarthy (1992), the *Anti-Spreading rule* blocks the spreading of [pharyngeal], as one instance of [pharyngeal] cannot be a distinguishing feature on more than one segment. This rule is not identical to ***Phary. Gem.** since it includes cases of $\alpha V \beta$, etc. But, ***Phary. Gem.** is a subset of 22. As shown in tableau 22., the ranking between *** $\tilde{V}(N)\text{ʕ}$** and **Phary. Gem.** cannot be established from the data we have in the LHQ since they both outrank **RM** (i.e., ***Phary. Gem.** >> **RM** and *** $\tilde{V}(N)\text{ʕ}$** >> **RM**) and no evidence of the domination of one over the other can be attested from nasal n patterns in the LHQ.

The motivation for the two constraints ***Obs. Gem.** and ***Son. Gem.** comes from Podesva (2000) where he examines geminates in two related Western Austronesian languages (Buginese and Selayarese) and establishes that “geminate sonorants are prohibited”. By extension, we could derive the constraint ***Obs. Gem.** (obstruent geminates are prohibited). An

observation I reach from my examination of the nasal n data in the LHQ is that ***Obs. Gem.** outranks *** Son. Gem.** (***Obs. Gem. >>* Son. Gem.**) suggesting that an obstruent geminate is more marked than a sonorant geminate. This is because the LHQ only allows sonorant geminates in 'idghām (*gemination with and without nasalization*) and not obstruent ones in 'ikhfā' (*nasal place assimilation*).

The rankings of ***Obs. Gem.** and ***Son. Gem.** in relation to **RM** are given in tableaux 24. and 25. We see from tableau 24. that **RM** dominates ***Son Gem.** (**RM>> *Son. Gem.**) since candidate b. qawlun maɾru:f- which is phonologically identical to the output form of the bare stem- is ruled out by **RM**. This opens the door for candidate a. qawlūm maɾru:f to win since it incurs a mild (non-fatal) violation of **Ident-place** and ***Son. Gem.** which are lower ranked.

Tableau 24. **RM >> Ident-place>> *Son Gem.**

qawlun maɾru:f _(T)	RM	Ident-place	*Son. Gem
a. qawlūm maɾru:f		*	*
b. qawlun maɾru:f	*!		

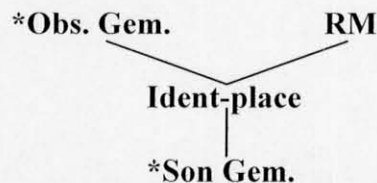
From tableau 25., we see that **RM>> Ident- [place]** (for ruling out candidate e. fənḏur) and ***Obs.Gem. >>Ident- [place]** (for ruling out candidate b. fənnḏur). Thus, no ranking can be established between ***Obs. Gem.** and **RM**.

Tableau 25. *Obs. Gem., RM >> Ident- [place]

fən <u>ḏ</u> ur _(T)	*Obs. Gem.	RM	Ident- [Place]
³⁶ a. fən <u>ḏ</u> ur			*
b. fəḏḏur	*!		
c. fən <u>ḏ</u> ur		*!	

From the ranking in 24. and 25. (Ident- [Place]>> *Son. Gem. and Obs. Gem.>> Ident- [Place]; see the lattice in 26. for illustration) we could conclude that **Obs. Gem.** outranks **Son. Gem.** by transitivity (*Obs. Gem.>> *Son. Gem.).

26. A conservative lattice summarizing the ranking between *Obs. Gem., *Son. Gem., RM and Ident-[place]



Maddieson (1988) as cited in Kager (1999) observes that nasal vowels are marked when compared with oral ones and that most of the languages of the world lack nasal vowels. The constraint “vowels must not be nasal” (Maddieson 1984) is active in both *ʾikhfāʾ* (*nasal place assimilation*) and *ʾiqḷāb* (*labial place assimilation*) since the vowel preceding nasal n becomes nasalized under both processes. In comparison with **RM**, * \tilde{V} is low ranked as shown in tableau 27.

³⁶ This example shows that primary place of articulation in emphatics is what spreads and not the secondary one.

Tableau 27. **RM>>*Ṽ>>Ident [place]**

j <u>un</u> bɪt _(r)	RM	*Ṽ	Ident- [place]
a. jũmbɪt		*	*
b. j <u>un</u> bɪt	*!		

Another markedness constraint is needed in both 'ikhfā' (*nasal place assimilation*) and 'iqḷāb' (*labial place assimilation*) to prevent candidates with an oral vowel preceding nasal n (or /m/ in 'iqḷāb' (*labial place assimilation*)) from being optimal. The constraint in question is *V_{ORAL}N which prohibits vowels from being oral before a tautosyllabic³⁷ nasal (Cohn 1993a). According to Cohn (1993 a – as cited in Kager (1999) – “vowels anticipate the nasality of the following stop, a preferred state of affairs from the viewpoint of perception and articulation” (p. 28). From this, we could generalize the universal markedness constraint prohibiting oral vowels before nasal stop whether they occur in the same syllable (tautosyllabic) or in adjacent syllables, as is the case in some words in the LHQ.

In tableau 28. below, candidate c. junbɪt is ruled out by the markedness constraint (*V_{ORAL}N) since the vowel /u/ preceding nasal m is not nasalized. This fatal violation incurs the optimality of candidate a. jũmbɪt.

³⁷ The term tautosyllabic is defined in Crystal (2003, p.457) “to characterize a pattern of SEGMENTS which can be analysed as belonging to the same SYLLABLE; contrasts with **heterosyllabic**, where the segments belong to different syllables. For example, the question of VCV syllabification can be discussed in terms of whether it is the VC or CV sequences which are best analysed as tautosyllabic.

Tableau 28. **RM**>> ***V_{ORAL}N**>> ***V**>> **Ident- [place]**

j <u>un</u> bɪt _(T)	RM	*V_{ORAL}N	*\tilde{V}	Ident- [place]
a. ɛ^{h} jũmbɪt			*	*
b. j <u>un</u> bɪt	*!			
c. j <u>um</u> bɪt		*!		*

The last markedness constraint to be discussed is ***Nas. Liquid** which prohibits nasalized liquids. This constraint is proposed in Walker (2000) where she investigates nasal harmony in Bantu languages. ***Nas. Liquid** is especially important in explaining why no nasalization is incurred when a nasal is followed by a liquid in *ʾidghām Kulli* (*gemination without nasalization*) in the LHQ data whereas when followed by any other sonorant, nasalization (either on the preceding vowel or on a semivowel) is rendered. A liquid followed by a nasal n is not a good sequence in the LHQ because they are very similar in that they share the coronal place of articulation, since they are both produced by the tip of the tongue. Tableau 28. below shows that ***Nas. Liquid** is outranked by **RM** but is higher than ***Son. Gem.** in *ʾidghām Kulli* (*gemination without nasalization*).

Tableau 29. ***Nas. Liquid**>> **RM**>> ***Son. Gem.**

m <u>in</u> riɓaɖilɓajl _(T)	RM	*Nas. Liquid	*Son. Gem.	Max [nasal]
a. ɛ^{h} mɪrriɓaɖilɓajl			*	*
b. m <u>in</u> riɓaɖilɓajl	*!	*		
c. mɪr̃riɓaɖilɓajl		*!		

Candidate b. mɪn ribaʔilɤajl violates **RM** since it is phonologically identical to the output form of the bare stem (mɪn ribaʔilɤajl_(ɪ)). Candidate c. mɪ[̃] ribaʔilɤajl incurs a fatal violation of ***Nas. Liquid** since it has nasalized liquids. Candidate a. mɪr ribaʔ ilɤajl surfaces as the most harmonic candidate since it violates lower ranking constraints, namely ***Son. Gem.** and **Max [nasal]**.

3.4 Nasal airflow

One question remains. Why do pharyngeals not trigger nasalization? It seems that there is something intrinsic to pharyngeals when it comes to their relation to nasals that blocks any kind of assimilation.

The issue raised here is that of **nasal leakage** from pharyngeal consonants which dates back to (1910) when Curry (cited in Zemlin (1968) cited in Ghazeli (1977)) “postulated that nasality could be caused by insufficient velo-pharyngeal closure, by pharyngeal constriction, or by excessive tensing, or by a combination of all of that” (p. 210). Delattre (1951 and 1971) reported by Hetzron (1969) states that the pharyngeals /ʕ/ and /ħ/ indicated three motions: “(a) the root of the tongue backed very sharply toward the lower part of the pharyngeal wall; (b) the larynx rose considerably (by about 8 mm after /i/, 13 mm after /a/ and 15 mm after /u/; (c) the uvula (the end of the soft palate, also called ‘lurette’) lowered down along the root of the tongue and curled up its tip as if to vibrate.” (Hetzron 1969, p. 72)

Hetzron (1969) continues to report Delattre’s findings by maintaining that “the radico-pharyngeal constriction of the Arabic laryngeals /ʕ/ and /ħ/ is so low that the

uvular tip must reach very low to the place which is most favourable for vibrating – just above the constriction. In so doing, the uvula forces the velum to leave the rhynopharyngeal wall and creates a velic opening such as the one found in nasal vowels”. This implies that pharyngeals cause nasalization.

Hetzron (1969) himself notices that a nasal *n* in the Eastern languages of Gurage occurs in contexts where a pharyngeal had been borrowed (probably from Arabic words containing them) into these languages and then turned into a laryngeal ($\hbar \rightarrow h$, $\text{ʕ} \rightarrow \text{ʔ}$). The schema in (13) shows this alleged **nasal airflow**.

(13) $\#L_1VC \rightarrow \#L_2V_nC$ (where L_1 is either a $/\hbar/$ or $/\text{ʕ}/$, L_2 is either a $[h]$ or $[ʔ]$ but not a uvular $[\chi]$ or $[\text{ʁ}]$ followed by a vowel which then receives nasality airflow and followed by another consonant.

Nasal airflow from pharyngeals is of import for the current work for two reasons. First, explains and validates the constraint $\ast\tilde{V}(N)\text{ʕ}$ since it assumes that vowels in the environment of a pharyngeal are likely to become nasalized. Consequently, cases where nasalization – in the environment of a pharyngeal – occurs are unmarked. Second, the observation that pharyngealization is accompanied by nasalization – under **nasal leakage** – implies that vowels in the environment of pharyngeals would more likely be retracted since the tongue root would be expected to be pulled down to the laryngeal region when the pharynx is narrowed as a result of the expansion of the larynx.

Certainly a physiological/aerodynamic experiment is needed to measure **nasal leak** from Arabic/the LHQ pharyngeals. It is noteworthy to mention here that Ghazeli (1977) did notice some symptoms of **nasal airflow** from one of his informants who was an Iraqi speaker but seemed to reject since his other informants did not produce any nasalization in the environment of pharyngeals. Unfortunately, due to time constraint I

could not check **nasal leakage** from pharyngeals. I, however, leave it open for future investigation and invite phoneticians – like Ghazeli does – to have a large number of informants to ensure the validity and reliability of results.

3.5 Summary of chapter three

In conclusion, this chapter has addressed a number of issues. First, it showed how natural classes of sounds (including sonorants, obstruents and gutturals) are treated in the Language of the Holy Qur'an and found that the natural class of gutturals crosscuts the other two classes of sonorants and obstruents. Second, it introduced the constraints that will be used in the next chapter in analyzing the LHQ patterns, using the framework of Optimality Theory (Prince and Smolensky 1993).

One of the basic principles of Kurisu's (2001) Realize Morpheme Theory is that faith is relativized to the morphosyntax being expressed. Here, we could generalize that faithfulness is relativized to the meaning (semantic/pragmatic; not just morphosyntactic) encoded which is *Tajwīd*. Ranking faithfulness constraints in respect to **RM** yield the four patterns of nasal n in the LHQ as we will see in section 4.6. The analysis reached in this thesis conforms to Kurisu's (2001 and 2002) schema the **Emergence of Nonconcatenative Morphology** where RM is positioned between faithfulness constraints (i.e., **Faith_α**>> **RM**>> **Faith_β**). Related to this idea of the relativization of faithfulness constraints to meaning is the observation that a violation of a high ranked faithfulness (**RM**) constraint is executed when violation of a lower ranked faithfulness constraint leads to violating some markedness constraint. In the LHQ, each pattern shows that violation of **RM** is achieved when lower ranked faithfulness constraints interact with markedness constraints.

Kurisu (2001) represents this relativization by subscripting the morphological category of continuative to the underlying forms he uses (/məqə-t_{continuative}/). In the same way, I show the relativization of faith to the meaning of *sacredness* or *Tajwīd* by attaching a T symbol to the output forms of the bare stem (e.g., junbit_(T)) or to faithfulness constraints in the summary lattice of constraints.

Section 4.2 discusses the importance of meaning in the LHQ and how the changes affecting nasal n make the language of the Holy Qur'an (LHQ) different from Modern Standard Arabic (MSA). Section 4.3 lays out the principles of Realize Morpheme Theory (Kurusu, 2001) and how it is modified to account for nasal n data in the LHQ. Section 4.4 revisits Realize Morpheme Theory and explains the expansions and modifications

needed. Section 4.5 tries to answer the question whether nasal *n* patterns are a morpheme. Finally, section 4.6 demonstrates how the different patterns of nasal *n* are analyzed using Kurisu's (2001) Theory of Realize Morpheme set in Optimality Theory (Prince and Smolensky 1993).

4.2 Language of the Holy Qur'an and Modern Standard Arabic

I wish to remind the readers that the two varieties of the LHQ and MSA are descendents of Classical Arabic. Neither MSA nor LHQ is what is used in everyday speech. MSA is primarily used as a means of instruction, in the media and press whereas the LHQ is a religious register that is used when reading the Qur'an and when performing prayers. Clearly, the difference between the two varieties of Arabic is that of *register* and *Tajwīd* which is treated in this work as a semantically/pragmatically meaningful element. The LHQ is regarded as sacred since – for Muslims – it is spoken by the Lord and in turn is more holy and higher in register.

4.3 Realize Morpheme Theory (Kurusu 2001)

4.3.1 Principles of RMT

According to the **Theory of RM**, every morpheme in the underlying representation receives some overt phonological exponence on the surface. Thus the output form has to be phonologically non-identical to the input form in order to satisfy **RM**. Kurisu (2001) defines RM as follows.

1. (Kurusu 2001, p. 39) *Realize Morpheme*

Let α be a morphological form, β be a morphosyntactic category, and $F(\alpha)$ be the phonological form from which $F(\alpha+\beta)$ is derived to express a morphosyntactic category β . Then RM is satisfied with respect to β iff $F(\alpha+\beta) \neq F(\alpha)$ phonologically.

This definition states that for a given **morphological form** $F(\alpha)$ and a **morphosyntactic category** β there exists another form $F(\alpha+\beta)$ such that $F(\alpha)$ and $F(\alpha+\beta)$ should be phonologically non-identical in order to satisfy Realize Morph. Applying this to the case of the nasal *n* patterns, one difference is evident, namely that of the information encoded in the output. All the words in the LHQ data (see appendix 2) do not exhibit changes in morphosyntactic categories. Instead, the changes happening to nasal *n* alter the meanings of words of regular speech in Arabic to a richer semantic/pragmatic meaning (e.g., *min waq* (MSA) \rightarrow *miṯ ṯwaq* (LHQ)). However, if one considers phonological forms alone, then, taking */min waq /* as $F(\alpha)$ and *miṯ ṯwaq* as $F(\alpha+\beta)$, we see that **RM** is satisfied as the two forms do not have the same phonological shape.

4.3.2 Evaluation of output forms in RM

Languages have constraint hierarchies which they use to evaluate the optimal output of the bare stem. Then they evaluate output candidates bearing morphosyntactic (grammatical) and non-grammatical information (semantic/pragmatic in the LHQ) generated by Gen with the output of the bare stem. RM is satisfied as mentioned before if the candidate is phonologically not identical to the output of the bare stem while it is violated if they have the same phonological shape.

Crucially, an output-output mapping (Benua 1995) is what is needed to calculate RM violations for two reasons. First, only outputs reliably have fixed phonological representations. Input-output mapping is not applied in RM because OT assumes **richness of the base** (Prince and Smolensky 1993, Smolensky 1996) which gives immense freedom to the input and in turn leaves the output forms without a reliable

unique form to compute the satisfaction/violation of RM. Second, output forms of the bare stems of the LHQ against which the candidates (output forms) are compared actually exist in Arabic as words. In other words, they are not lexical entries but are rather word forms. For instance, $m\alpha n\int ur\emptyset$ (publicized) which is realized as $m\tilde{\alpha}n\int ur\emptyset$ (publicized) in the LHQ (undergoing 'ikhfā', *nasal place assimilation*) is an existing word in Arabic (in MSA).

4.4 Realize Morpheme revisited

Here, I come back to the question raised in chapter one of “how does grammar account for the meaning expressed by the nasal n patterns in the LHQ formally?” As we saw in section 4.3.1, Kurisu’s (2001) Realize Morpheme Theory does not fully account for *Tajwīdal* phenomena, since the latter does not exhibit morphosyntactic phenomena. Clearly, it is necessary to change the definition of Realize Morpheme to encompass any kind of meaning change.

Thus, the definition given in 1. should be expanded to include non-morphosyntactic categories as well as morphosyntactic ones. I propose the following redefinition:

2. Realize Morpheme Theory revisited

Let α be a morphological form, β be a “meaning” element, and $F(\alpha)$ be the phonological form from which $F(\alpha+\beta)$ is derived to express a “meaning element” β . Then RM is satisfied with respect to β iff $F(\alpha+\beta) \neq F(\alpha)$ phonologically.

The definition of **RM** given in two would cover the term “meaning” which also includes register. This takes us back to **triglossia** which was introduced in chapter one. According to **triglossia**, the LHQ is set as the highest register based on the meaning of

sacredness which characterizes it. Hence, meaning correlates with *register shift* in the LHQ.

4.5 Are nasal processes a morpheme?

A question that is left unanswered relates to the nature of the four patterns of nasal *n* in the LHQ. Do they constitute a *morpheme* or are they merely phonological patterns carrying a pragmatic/semantic meaning? Entertaining both options is what this section aims at.

Since Kurisu's (2001) Theory of Realize Morpheme set in Optimality Theory is the general framework assumed and used in this work, it seems reasonable to consider whether one should treat the four patterns of 'idghām, 'ikhfā', 'iqlāb and 'izhār as allophones of some morpheme as Kurisu does to the Halkomelem continuative morpheme. Nonetheless, it is first necessary to define and describe what a morpheme is and then to check whether the case of the LHQ patterns at hand fits with its range of definition and connotation.

Baudouin de Courtenay the coiner of the term "morpheme" defines it as "that part of a word which is endowed with psychological autonomy and is for the very same reasons not further divisible" (1972 [1895], 153). Bloomfield (1933:161) as cited in Anderson (1992) limits it to "a linguistic form which bears no partial phonetic-semantic resemblance to any other form". Crystal's (2003) dictionary has it as "the smallest functioning unit in the composition of words" (p.300). Haspelmath (2002) extends Crystal's definition to "a set of morphs (which are often but not always formally similar) and only morphs can be pronounced and used in performance" (p. 31). These concretely form "a minimal morphological constituent" and abstractly, "the set of alternating

morphs that have the same meaning and occur in complementary distribution” (Haspelmath 2002, p. 31).

The first approach to analyze the LHQ patterns is to assume that they are allomorphs of one morpheme, namely *Tajwīd* in essence. In this respect, the four patterns of *ʾidghām*, *ʾikhfāʾ*, *ʾiqlāb* and *ʾizhār* fulfill the requirement of being in complementary distribution, since each pattern is restricted to a specific environment. *ʾidghām* occurs only in the environment of sonorants, *ʾikhfāʾ* in that of obstruents other than /b/, the latter of which feeds for *ʾiqlāb* and *ʾizhār* is restricted to gutturals only.

Anderson (1992) allows *phonologically null sequences* or zero morphs, ablaut (replacive morphs; vowel change), deletion processes, metathesis, reduplication and other operations as morphemes (Word and Paradigm, Anderson 1982) even when they refer to abstract objects. Likewise, one could argue that *gemination*, *nasal* and *labial place assimilation* and *zero nasal assimilation* are morphs/ allomorphs of one morpheme.

A third point in favour of a morpheme-based approach is that raised by Bloomfield as cited in Anderson (1992) where he contends, “every form is made up entirely of morphemes”. According to this postulation, once a morpheme is recognized within a word and extracted, it follows that the residue is another morpheme. If we consider the changes that target nasal n in the LHQ as morphemes, then extracting them leaves us with MSA words which are themselves morphemes.

According to an amorphemic-based approach, the four patterns should not be viewed or treated as allomorphs of a morpheme for a number of reasons. First and foremost, nasal n changes in the LHQ are patterns which do not constitute “a *minimal* same of form and meaning” (Bloomfield 1933). In other words, they do not have the

same phonological/phonetic shape since they include different changes even though they correspond to the same meaning; *Tajwīd* or *sacredness*.

Second, morphologists usually make a distinction between **lexical** and **grammatical** morphemes. Neither of these subsumes the four patterns of nasal n or any of the processes/patterns of *Tajwīd*. **Lexical** morphemes are those used to create new words in a language such as forming compounds (e.g. bluebird) (Crystal, 2003) and they correspond to the known parts of speech – nouns, verbs, adjectives and adverbs. Aronoff (1994) uses the term “vocabulary words” to refer to **lexical** morphemes or words which Chomsky (1965) dubs the *major lexical categories*.

On the other hand, **grammatical** morphemes are used to denote grammatical or functional relationships between a word and its context (Crystal 2003) based on some dimension. Some examples of these are plurality or past tense (inflections on words) which are members of some paradigm of a particular lexeme (Aronoff 1994).

The latter argumentation of Aronoff that grammatical morphemes are lexemes opens a new window of interpretation of the term *morpheme* which is now tied with the general term *lexeme*. A conclusion can be drawn from the above flow of postulation. The four patterns of *ʾidghām*, *ʾikhfāʾ*, *ʾiqlāb* and *ʾizhār* do not express any grammatical meaning. Hence, they cannot be said to function as grammatical morphemes nor could they be regarded as lexical morpheme either since they do not lie within the range of conventional lexical morphemes (known parts of speech).

Mel'čuk (1982) interprets the term *lexeme* (which now embodies the term *morpheme*) as a sign or a set of signs which combines form, syntax and meaning all in one entity. Aronoff (1994) argues that lexemes, as vocabulary words are “unspecified for

those contextually variable syntactic, semantic and pragmatically determined categories that are encoded by inflection”.

This general take reminds us of *sound symbols* or *phonetic symbolism* in natural languages used in literary works (Jespersen 1922, Newman 1933, Brown 1958, Greenberg 1961, Kess 1992) if compared to the term *sign* that Mel’čuk uses. The term *Sound symbolism* is used when a sound/form is associated with a particular meaning of language. The two types the term *sound symbolism* covers are primary and secondary onomatopoeia. According to the first type, some sounds of language are used to denote properties of the external world (e.g., *cuckoo*, *murmur*, *crash*, etc). The second type is what is relevant to our purpose. Some examples of this type are forms of *synaesthesia* (Crystal 2003) of words having *sl-* in them such as *slimy*, *slither*, *slippery* (encoding the meaning of slipping because of greasiness) or *gl-* as in *glimmer*, *glitter*, *glisten*, *gleam*, *glint*, *glowing*, *glamour* (shining).

The celebrated example in the literature of *sound symbolism* is that of *smallness* linked with the sound [i] on many languages of the world. Examples of this come from English (*little*, *slim*, *thin*, *wee*, *teeny-weeny*), French (*petit*), Italian (*piccolo*), Rumanian (*mic*), Latin (*minor*, *minimus*), Greek (*mikrós*), Hungarian (*kis*, *kicsi*, *pici*), Arabic (*sagheer* /ṣaḡeer/) ³⁸. Jespersen (1922, p. 118) and Neman (1933) were among the advocates of the universality of *phonetic symbolism* (or *vowel symbolism* in the case of vowel [i] (Neman, 1933)). However, later efforts of researchers concluded that cases of *sound/phonetic symbolism* are language specific tendencies (Brown 1958, Greenberg 1963 and Kess 1992). Modern linguists have regarded cases of *sound symbolism*

³⁸ All the examples except *sagheer* /ṣaḡeer/; little (Arabic) come from Greenberg (1961).

(consonantal and vowel symbolism) as posing a challenge to a morpheme-based approach.

Reviewing the two approaches of how to view the four patterns of 'idghām, 'ikhfā', 'iqḷāb and 'izhār helps us reach the conclusion that these patterns are not exactly identical to morphemes, nor are they exactly identical to *sound symbolism*; instead *Tajwīd* exhibits elements of both morphemes and *sound symbolism*. I suggest therefore that it is necessary to use a different term for *Tajwīd* namely, "meaning element". This conclusion is consistent with my earlier redefinition of Realize morpheme as Realize meaning.

4.6 Analysis of nasal n data

A remark that should be made at this point – derived from Kurisu's (2001) Theory of Realize Morpheme – is that each pattern of nasal n in the LHQ is determined by a particular faithfulness constraint (such as **Max- [nasal]**) ranked either below or higher than **RM**. This faithfulness constraint interacts with another/other markedness constraint/s (such as ***Son. Gem.**), which eventually triggers the violation of **RM**. For instance, 'idghām (*gemination with nasalization*) is achieved by the ranking **RM>> *Son. Gem.>> Max- [nasal]**, 'idghām (*gemination with nasalization*) by ***Nas. Liquid>> RM>> *Son. Gem.>> Max- [nasal]**, 'ikhfā' (*nasal place assimilation*) and 'iqḷāb (*labial place assimilation*) by **RM>> *Ṽ>> Ident-OO [place]** whereas 'izhār (*zero nasal assimilation*) by the ranking ***Ṽ(N)ʔ, Max-μ>> RM** since no phonological change is triggered. Ranking faithfulness constraints in respect to **RM** is what is one reflection of the relativization of faith to the meaning being expressed (*Tajwīd/sacredness* in the LHQ).

4.6.1. *ʾidghām* (gemination with and without nasalization)


Some of the examples showing *ʾidghām*; *gemination with nasalization* (bɪɤunnəh) and *without nasalization* (bɪdu:n ɤunnəh) are reproduced in 3. and 4. respectively.

3. a. man jaqu:l → mɛj̣ jaqu:l من يقول b. min wa:l → mɪw̃ wa:l من وال
c. ʔin nahnu → ʔĩn nahnu إن نحن d. min ma:ʔ → mĩm ma:ʔ من ماء

4. a. min rabbihim → mir rabbihim من ربيهم
b. ʔan lan taqu:l → ʔaɫ laɫ taqu:l أن لن تقول

The ***Son Gem.** constraint (Podesva 2000) is very active in the process of *gemination* (*ʾidghām*) *with and without nasalization* since a sequence of two identical sonorants is produced. Candidates a. mɛj̣ jaqu:l and e. mɛj jaqu:l both violate the lower ranking constraint ***Son. Gem.**. Here, **Max [nasal]** triggers candidate a. mɛj̣ jaqu:l – which violates ***Son.Gem.** – to surface as the optimal output since it is violated by candidate e. mɛj jaqu:l,


5. Gemination with nasalization (*ʾidghām bi ghunnah*: /ʔɪdɤa:m bɪɤunnəh/)

menjaqu:l _(T)	Max-μ	RM	*Ṽ	*Son.Gem.	Max [nasal]
a.  mɛj̣ jaqu:l				*	
b. mɛn jaqu:l		*!			
c. mɛ jaqu:l	*!				*
d. mɛj̣ jaqu:l			*!	*	
e. mɛj jaqu:l				*	*!

In tableau 5., candidate b. mɛn jaqu:l incurs a fatal violation of **RM** since it is phonologically identical to the output form of the bare stem mɛn jaqu:l_(T). Candidate c. mɛ jaqu:l- with a deleted moraic n- violates the highest ranking faithfulness constraint **Max-μ**. Finally, candidate d. mɛ̃j̃ jaqu:l violates ***Ṽ** which militates against having nasalized vowels in the output.

In addition to ***Son. Gem.**, ***Nas. Liquid** seems to play an important role in the process of *'idghām Kulli* (*gemination without nasalization*) to prevent forms with a sequence of a nasal followed by a liquid from surfacing as in d. mɪr̃ rabbɪh in tableau 6.

6. Gemination without nasalization (*'idghām bidoon ghunnah*: ʔɪdʒɑ:m bɪdu:n ʁunnəh)

mɪn rabbɪh _(T)	Max- μ	*Nas. Liquid	RM	*Ṽ	*Son. Gem.	Max [nasal]	Ident [nasal]
a.  mɪr rabbɪh					*	*	
b. mɪn rabbɪh			*!				
c. mɪ rabbɪh	*!					*	
d. mɪr̃ rabbɪh		*!			*		*
e. mɪr̃ rabbɪh				*!	*		*

Candidate b. mɪn rabbɪh is eliminated by **RM** since b. is phonetically identical to the output form of the bare stem. Candidate c. mɪ rabbɪh incurs a fatal violation of **Max-μ** since the moraic nasal n is deleted in the output in c. and is hence ruled out. Candidate d. mɪr̃ rabbɪh- as mentioned above- is ruled out by ***Nas. Liquid** for having nasalized liquids in mɪr̃ rabbɪh while candidate e. mɪr̃ rabbɪh is ruled out by ***Ṽ** for

having a nasalized vowel /ĩ/. From tableaux 5. and 6. we could generalize that in the process of *gemination with and without nasalization*, faith is relativized to the meaning of sacredness since 'idghām juz'i (*gemination with nasalization*) is triggered by the ranking **RM>>*Son. Gem.>> Max- [nasal]** and 'idghām kullī (*gemination with nasalization*) by ***Nas. Liquid>>RM>>*Son. Gem.>> Max- [nasal]**.

4.6.2. 'ikhfā' and 'iqlāb

Some examples illustrating 'ikhfā' are reproduced in 7. where six allophones of nasal n are realized.

7.

1. [ŋ] before velar sounds (/k/)

a. ʔanka:la → ʔəŋka:lə أنكالا

2. [ɲ] before palatals (/ʃ/ and /dʒ/)

a. wajanʃar → wəjəɲʃur وينشر

b. ʔandʒajna → ʔəɲdʒajne أنجينا

3. [n] before interdental and denti-alveolars (/t/, /t̪/, /d/, /d̪/, /s/, /s̪/, and /z/)

a. kuntum → kũntum

b. min ʔajjiba:t → mĩn ʔajjiba:t من طبيبات

c. waman dakalah → wəməɫn dakələh ومن دخله

d. ʔin ɖalalt → ʔĩn ɖələlt إن ضللت

e. baʃaran sawijja → baʃarɫn sawijje ايوس ارشب

f. min ʃalʃa:l → mĩn ʃələʃa:l من صلصال

g. man zakkaha → məɫn zəkkahe من زكاهها

4. [ɲ] before dentals (/θ/, /ð/ and /ð̪/)

a. muʔa:ʃin θɫmə → muʔa:ʃĩɲ θɫmə مطاع ثم

b. man ɖallaði → məɫɲ ɖəllaði من ذا الذي

c. quran ɖa:hi rəh → qurəɲ ɖa:hi:rəh قرى ظاهرة

5. [w̃] before labio-dentals (/f/)

- a. musaḳkara:tɪnfi → musaḳkara:tĩw̃ fi مسخرات في

6. [N] before uvulars (/q/)

- a. sami:ʕunqari:b → sami:ʕũN qari:b سميع قريب

Three more constraints enter the picture in 'ikhfa' namely, ***Obs. Gem.**, ***V_{ORAL}N** and **Ident-place** in addition to ***Ṽ** which is active in the process of 'idghām (*gemination with and without nasalization*). This is because nasal n in this process is changed into a homorganic allophone to the following obstruent and nasalizes a preceding vowel in some cases (when followed by a nasal). The obstruent following nasal n in this process is not geminated like sonorants in the process of 'idghām (*gemination with and without nasalization*). This accounts for the fact that **RM** is ranked above ***Ṽ** and **Ident-place**. ***Obs. Gem.** is activated by the existence of ***Son. Gem.** (Podseva, 2000) and seems to be more marked than it (***Obs. Gem.** >> ***Son. Gem.**) (as mentioned in chapter 3 since obstruents tend not to form geminates in the LHQ. It is difficult to establish ranking between ***Obs. Gem** and **RM** since there is no evidence from the language for the precedence of one over the other. From tableau 8. below, we can see that candidates b. through e. are all losers for various reasons.

8. Nasal place assimilation ('ikhfā': ʔɪχfā:ʔ)

$m\Delta n\theta u:r\theta_{(T)}$	Max-μ	*Obs. Gem.	RM	*V_{ORAL}N	*\tilde{V}	Ident-place	Max [nasal]	Ident [nasal]
a. $m\tilde{\Delta}n\theta u:r\theta$					*	*		*
b. $m\Delta\theta u:r\theta$	*!						*	
c. $m\tilde{\Delta}\theta\theta u:r\theta$		*!			*			*
d. $m\Delta\theta\theta u:r\theta$		*!					*	
e. $m\Delta n\theta u:r\theta$			*!					
f. $m\Delta n\theta u:r\theta$				*!		*		
g. $m\Delta d\theta u:r\theta$							*!	

Candidate b. $m\Delta\theta u:r\theta$ is ruled out by **Max- μ** because it loses nasal n along with its mora. Both candidates c. $m\tilde{\Delta}\theta\theta u:r\theta$ and d. $m\Delta\theta\theta u:r\theta$ incur fatal violations of ***Obs. Gem.** for they have two obstruents in a row. Candidate e. violates **RM** which militates against the output form being phonologically identical to the output form of the bare stem ($m\Delta n\theta u:r\theta$). Candidate f. $m\Delta n\theta u:r\theta$ which is allowed by *** \tilde{V}** is ruled out by a conflicting constraint namely, ***V_{ORAL}N** which militates against having an oral vowel preceding nasal n in the output. Candidate g. $m\Delta d\theta u:r\theta$ with a sequence of two obstruents is ruled out by **Max [nasal]** since nasal n in the output form of the bare stem $m\Delta n\theta u:r\theta$ denasalizes to a /d/; i.e., losing its nasality feature [+nasal]. Finally, candidate a. $m\tilde{\Delta}n\theta u:r\theta$ surfaces as the optimal output as it does not violate any of the high ranking constraints.

The process of *'iqḷāb* (*labial place assimilation*) is exemplified in 9. below.

9. a. ʔanbiʔu:ni → ʔəmbiʔuni أنبنوني
b. min baʔd → mīm baʔd من بعد

Like in *'ikhfā*, the two constraints **V_{ORAL}N* and **Ident-place** are active and ranked below **RM** in order to make the most harmonic output surface. As shown in tableau 10., **RM** rules out candidate b. ʔənbɪʔhum which is identical to the output form of the bare stem. Both candidates c. ʔəbɪʔhum and d. ʔəbɪʔhum are eliminated by **Max-μ** as the mora of nasal n gets deleted as a result of the segment's deletion. Candidate e. ʔəmbɪʔhum incurs a fatal violation of **V_{ORAL}N* since the vowel /ə/ preceding nasal n in e. is not nasalized. Finally, Candidate a. ʔəmbɪʔhum surfaces as the most harmonic output since it violates lowest ranking constraints.

10. *'iqḷāb* (*labial place assimilation*: ʔɪqla:b)

ʔənbɪʔhum _(T)	Max-μ	RM	*V _{ORAL} N	* \tilde{V}	Ident [place]	Max [nasal]	Ident [nasal]
a. ʔəmbɪʔhum				*	*		*
b. ʔənbɪʔhum		*!	*				
c. ʔəbɪʔhum	*!			*			*
d. ʔəbɪʔhum	*!					*	
e. ʔəmbɪʔhum			*!		*		

In fact, the analysis shows that *'ikhfā* (*nasal place assimilation*) and *'iqḷāb* (*labial place assimilation*) are essentially the same process which is triggered by ranking **Ident-OO [place]_(T)** – which interacts with ** \tilde{V}* – below **RM**; **RM** >> ** \tilde{V}* >> **Ident-OO [place]_(T)**.

4.6.3. 'izhār (zero nasal assimilation) /ʔɪðhɑ:r/

It was mentioned before that nasal *n* does not assimilate in any way (to place or manner of the following segment) when followed by a guttural sound (uvulars /χ/ and /ʁ/), pharyngeals (/ħ/ and /ʕ/) or laryngeals (/h/ and /ʔ/). Some words typifying 'izhār are shown in 11. below.

11. a. min ɛajr ʃaj → min ɛajr^ɪ ʃaj من غير شيء
 b. ʃazi:zun ɛafu:r → ʃazi:zun ɛafu:r عزيز غفور
 c. munhamir → munhamir منهمر
 d. ʔadʒarun ʃaði:m → ʔadʒərun ʃaði:m أدر عظيم
 e. qawmin ha:d → qawmin ha:d قوم هاد
 f. bisala:min ʔa:mini:n → bisala:min ʔa:mini:n بسلام أمين

Since no changes take place in 'izhār, violating **RM** in tableau 12. will eliminate the intended output (a. janʔawn) once candidate d. jaʔawn is ruled out by the highest faithfulness constraint **Max-μ**. Here a persisting need for the two markedness constraints ***V̥(N)ʕ** and ***Phary. Gem.** arises to stop candidates b. jāʔawn, c. jaʔʔawn and e. jānʔawn from surfacing. This is consistent with Kurisu's (2001) observation about Upriver Halkomelem continuative allomorphs that a violation of a high ranked faithfulness constraint (**RM**) is achieved when violation of a lower ranked faithfulness constraint (**Ident-nasal**) results in violating some markedness constraint/s (***Phary. Gem.** and ***V̥(N)ʕ**) which outrank/s the higher ranked faithfulness constraint. This is clearly the case in tableau 12.

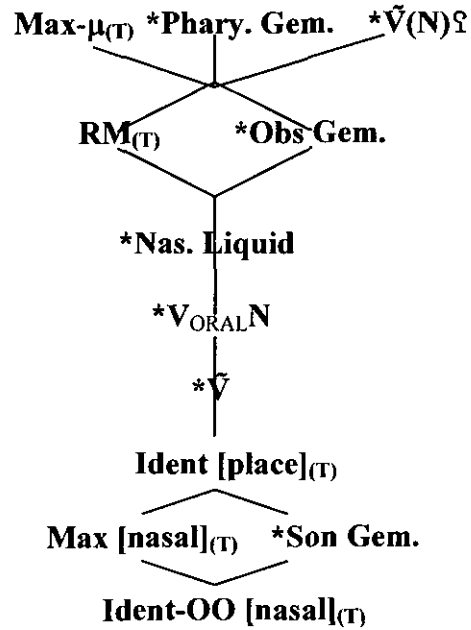
12. *ʔizhār* (zero nasal assimilation: /ʔɪðhɑ:r/)

janʔawn _(T)	* \tilde{V} (N)ʔ	*Phary. Gem.	Max -μ	RM	*V _{ORAL} N	* \tilde{V}	Max [nasal]	Ident [nasal]
a. janʔawn				*	*			
b. jāʔawn	*!					*		*
c. jaʔʔawn		*!					*	
d. jaʔawn			*!				*	
e. jānʔawn	*!					*		*

4.6. Summary of chapter four

To recapitulate, the analysis presented here argues that meaning can be realized even if it were not grammatical (non-morphosyntactic). Following Kurisu's (2001) Realize Morpheme Theory I implement the basic principle of constraints interaction derived from Optimality Theory (Prince and Smolensky 1993). Kurisu's **Realize Morpheme (RM)** constraint is generalized to Realize Meaning (**RM**) to meet the special meaning of holiness of Qur'anic words. The proposed constraints and their ranking are summarized in the lattice in 13.

13. A summary Lattice of constraint ranking



Two basic conclusions consistent with Kurisu's (2001) reached here are (1) a violation of a high ranked faithfulness constraint is executed when violation of a lower ranked faithfulness constraint leads to violating some markedness constraint and (2) faith is relativized to the meaning expressed.

Chapter 5

Concluding remarks

Conclusion

The Language of the Holy Qur'an presents evidence that meaning can be realized even if it is not morphosyntactic; a finding questioning Kurisu's (2001) Realize Morpheme Theory. The tradition of the Holy Qur'an's recitation- known as *Tajwīd*- has an underlying semantic/pragmatic meaning which is that of *sacredness*. Out of the twenty-eight processes/patterns comprising *Tajwīd*, four patterns of nasal n assimilation ('aḥkām 'anūn 'asākinah) broken down into 'idghām (*gemination with and without nasalization*), 'ikhfā' (*nasal place assimilation*), 'iqlāb (*labial place assimilation*) and 'izhār (*zero nasal assimilation*) in the LHQ are examined in this work.

The LHQ's twenty-eight sounds distributed among the four patterns of nasal n assimilation are grouped into the three natural sound classes of sonorants, obstruents and gutturals. One major observation made in this thesis is that gutturals (used in the pattern of 'izhār; *zero nasal assimilation*) crosscut the two sound classes of sonorants and obstruents.

Under Realize Morpheme Theory (Kurusu 2001) set in OT (Prince and Smolensky 1993), the four patterns of nasal n in the LHQ are explained by ranking **RM** (Realize meaning which is generalized from Kurisu's (2001) Realize Morpheme constraint) above the other faithfulness constraint except **Max-μ** which outranks it; **Max-μ >> RM >> Faith**. The pattern of 'izhār (*zero nasal assimilation*) is particularly interesting since no change takes place. According to Kurisu's (2001) Realize Morpheme Theory, there has to be some overt change for meaning to be realized (i.e., the input and the output have to be

phonologically non-identical). In *ʾizhār*, we find that the two markedness constraints **Ṽ(N)ʕ* and **Phary. Gem.* which are ranked higher than **RM** help prevent unintended candidates from surfacing. The interaction of these constraints with **Ident [nasal]** leads to the execution of **RM**.

Another observation highlighted in this thesis is that a sequence of a nasalized vowel and a guttural (specifically a pharyngeal) is not well-formed in the LHQ; i.e., no assimilation in the environment of a guttural is allowed. The constraint **Ṽ(N)ʕ* is motivated by assuming that there is **nasal leak** from pharyngeals to vowels in their environment. A physiological/aerodynamic experiment to check this phenomenon was not conducted due to limitation of time. Further research and experimentation need to be done in this area.

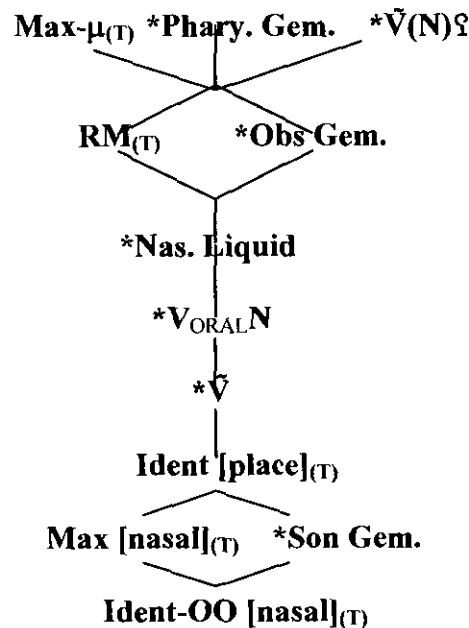
A third observation made is that liquids cannot be nasalized, in keeping with Walker's (2000) **Nas. Liquid* constraint. This constraint could be motivated based on the observation that nasals and liquids are both coronals; they share the same place of articulation. Alternatively, we could argue that liquids also have continuous airflow, like nasals. Consequently, a form like *mīṛṛāj̣b* (in the process of *ʾidghām Juzʾi* (*gemination without nasalization*) is ill formed.

A fourth conclusion is that the two processes of *ʾikhfāʾ* (*nasal place assimilation*) and *ʾiqḷāb* (*labial place assimilation*) are phonologically the same since they both involve the assimilation of nasal *n* to the following obstruent's place of articulation and the nasalization of the preceding vowel.

Moreover, the guttural class in the LHQ does not include the uvular stop /q/ or emphatics. And finally, retraction implies lowering of vowels (in the sense of laryngeal constriction pulling vowels to the lower back quadrant of the vocal tract's space).

The ranking of the constraints used in analyzing the LHQ nasal patterns is illustrated in the lattice in 1. below. According to 13., three constraints outrank **RM**. These are **Max- $\mu_{(T)}$** , ***Phary. Gem.** and *** $\tilde{V}(N)\text{?}$** . No ranking is established between ***Obs. Gem.** and **RM**.

1. A summarizing lattice of the constraints used and their ranking



Five constraints are outranked by **RM** (***Nas. Liquid**, ***VORALN**, ***Ṽ**, **Ident [place](T)**, ***Son Gem.**, **Max [nasal](T)** and **Ident [nasal]**), three of which are faithfulness constraints (**Ident [place](T)**, **Ident [nasal]** and **Max [nasal](T)**). In 1., faith is shown to be relativized to the underlying meaning of *sacredness* (or *Tajwīd*) by subscripting a T (symbol for *Tajwīd*) under faithfulness constraints. In the LHQ, the relativization of faith

to the meaning of *sacredness* is reflected by ranking different faithfulness and markedness constraints in respect to **RM**. For instance, 'idghām juz'ī (*gemination with nasalization*) is executed by ranking **RM** above **Max [nasal]_(T)** and ***Son.Gem.>> Max [nasal]_(T)** whereas 'idghām kullī is triggered by the ranking ***Nas. Liquid>> RM>> Max [nasal]**, ***Son. Gem..** Both 'ikhfā' (*nasal place assimilation*) and 'iqlāb (*labial place assimilation*) are executed by ranking **RM** above **Ident [place]_(T)** and ***Ṽ; RM>> *Ṽ>>Ident [place]_(T)**. 'izhār (*zero nasal assimilation*) is achieved by ranking **Max-μ_(T)** and ***Ṽ(N)ɣ** above **RM**; **Max-μ_(T), *Ṽ(N)ɣ>>RM**.

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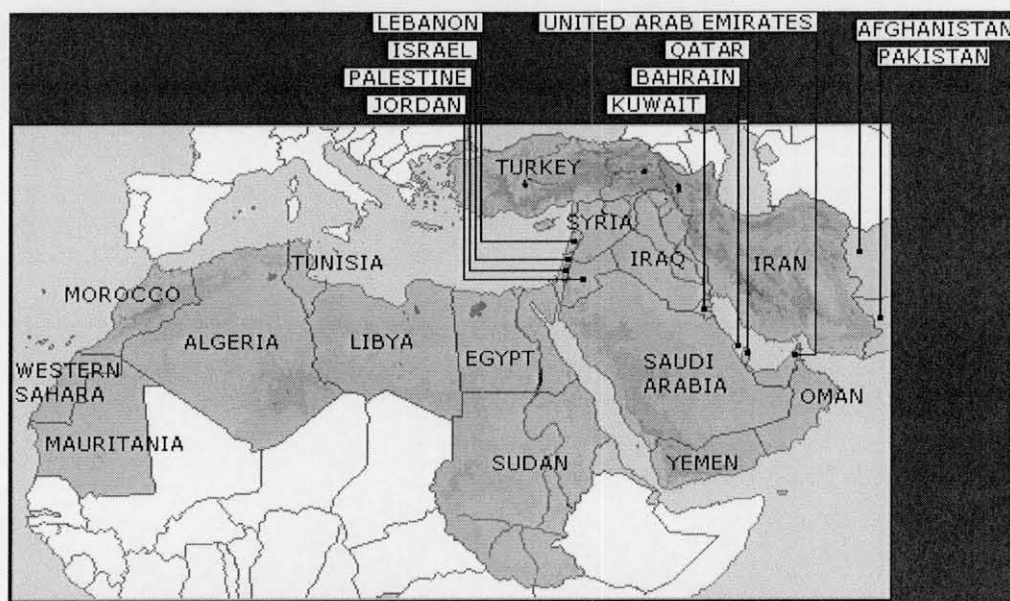
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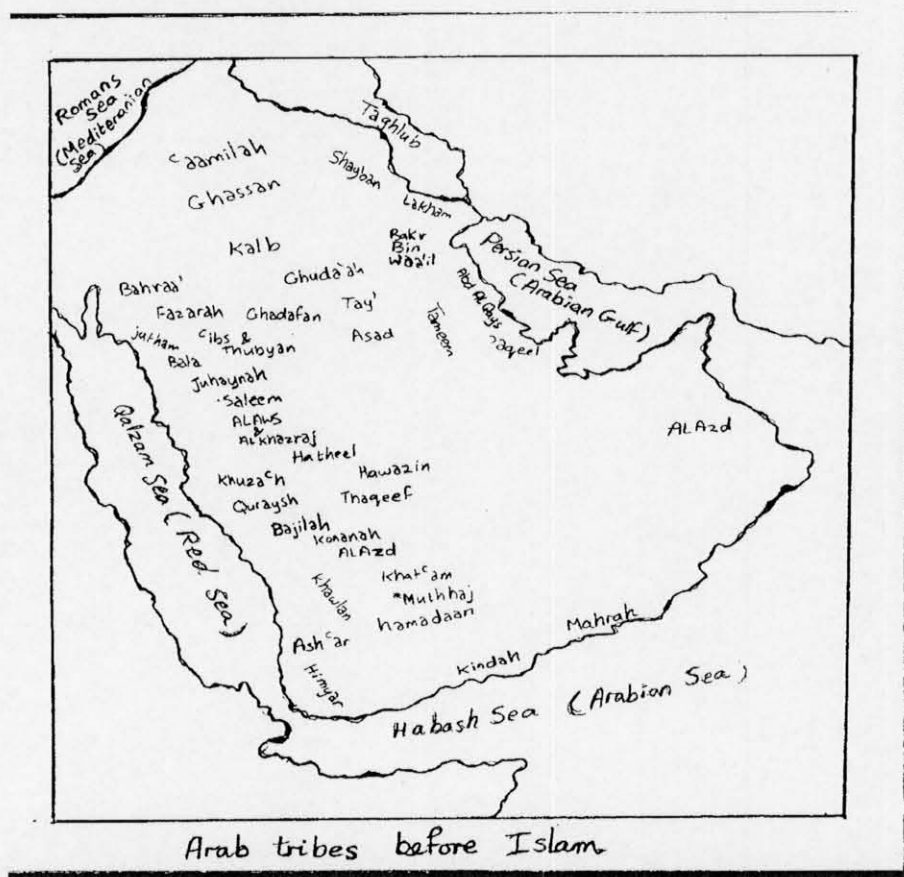
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Appendix 1. Parts of the Islamic world today and before the Islamic era

Map (1): Some Muslim and Arabic countries (www.mideastweb.org/maps.htm)



Map (2): Arab tribes in the Arabian peninsula before Islam (Ar-Rajhi 1969)



Appendix 2. The LHQ data

The following tables include two hundred and fifty words excerpted from the Holy Qur'an (Mushaf 'a-Tajwīd (1999)) which are used in the present study. The data are divided into two major categories namely, words ending in “non-syllabic n” and words ending in Tanwīn. Within this division, the language of the Holy Qur'an's words are divided among four patterns of nasal n which include 'izhār (zero nasal assimilation), 'idghām (gemination with and without nasalization), 'iqlāb (labial place assimilation), and 'ikhfā' (nasal place assimilation).

Every table is divided into four columns. Column one shows the LHQ words in IPA (International Phonetic Association) transcription while column two shows them transcribed in Arabic. Column three cites the chapter and the verse in which every word appears in the Mushaf. Finally, column four transliterates the words in Roman letters.

1. 'izhār (zero nasal assimilation)

I. Words ending in “non-syllabic (n)”:

A. Within the same morpheme (in medial position):

Word	In Arabic	Citation	Transliteration
1. janʔawn→janʔawn	يَأُون	(6: 26)	yan'awn
2. ʔalʔanha:r→ʔəlʔənha:r	الْأَنهَار	(2: 25)	'a'anhār
3. walʔanʔa:m→wəlʔənʔa:m	وَالْأَنْعَام	(3: 14)	wal'an'am
4. janhawn→janhawn	يَهْوَن	(6: 26)	yanhawn
5. fanha:r bih→fənha:r ^a bih	فَأَنهَارَ بِهِ	(9: 109)	fanhara bih
6. munhamir→munhamir	مُنْهَمِر	(54: 11)	munhamir
7. minhum→minhum	مِنْهُمْ	(5: 13)	minhum
8. janhitu:n→janhe ^t tu:n	يَنْحِتُونَ	(15: 82)	yanhitūn
9. wanhar→wanher	وَأَنْحَر	(108: 2)	wanhar
10. fasajanġ idu:n→fəsajenġ e ^t du:n	فَسَيَنْغُضُونَ	(17: 51)	fasayanghidūn

11. walmunḫaniqah→ walmunḫaniqəh	والمُنْخَنِقَة	(5: 3)	walmunkhaniqah
12. ʔanʕamta→ʔanʕamtə	أَنْعَمْتَ	(1: 7)	'an'amta
13. janʕiq→janʕe ^r q	يَنْعَقُ	(2: 171)	yan'iq

B. Across morpheme boundaries (in junctural position):

Word	In Arabic	Citation	Transliteration
1. man ʔaʕta→man ʔaʕtə	مَنْ أَعْطَى	(92: 5)	man 'a'tā
2. min ʔaḥad→min ʔaḥəd	مِنْ أَحَدٍ	(2: 102)	min'aḥad
3. min ʔanba:ʔiha→min ʔanba:ʔihə	مِنْ أَنْبَاءِهَا	(7: 101)	min a'nba'iha
4. waman ʔaḍlam→wəməŋ ʔaḍləm	وَمَنْ أَظْلَمَ	(2: 114)	waman 'azlam
5. man ʔa:man→man ʔa:mən	مَنْ آمَنَ	(2: 62)	man 'āman
6. ʔin huwa→ʔin huwə	إِنْ هُوَ	(6: 90)	'in huwa
7. man ha:dʒar→man ha:dʒər	مَنْ هَاجَرَ	(59: 9)	man hājar
8. ʔin haḍa→ʔin haḍə	إِنْ هَذَا	(6: 25)	'in hadha
9. min ḥaki:m→min ḥaki:m	مِنْ حَكِيمٍ	(41: 42)	min ḥakim
10. man ha:d ʔaḷḷah→man ha:d ^o ḷah	مَنْ حَادَّ اللَّهَ	(58: 22)	man ḥādalah
11. min ḥasanah→min ḥasanəh	مِنْ حَسَنَةٍ	(4: 79)	min ḥasanah
12. min ḡil→min ḡil	مِنْ غُلٍ	(7: 43)	min ghil
13. min ḡajr ʕaj→min ḡaj ^o r ⁱ ʕaj	مِنْ غَيْرِ شَيْءٍ	(52: 35)	min ghayry shay'
14. min ḡisli:n→min ḡisli:n	مِنْ غَسْلِينَ	(69: 36)	min ghislīn
15. min ḡajrikum→min ḡajrikum	مِنْ غَيْرِكُمْ	(5: 106)	min ghayrikum
16. min ḫajar→min ḫajər	مِنْ خَيْرٍ	(2: 105)	min khayr
17. min ḫawf→min ḫawf	مِنْ خَوْفٍ	(106: 4)	min khawf
18. man ḫaʕij→man ḫaʕij ^o	مِنْ خَشْيَةٍ	(50: 33)	man khashiya
19. min ʕilm→min ʕi ^o lm	مِنْ عِلْمٍ	(6: 148)	min 'ilm
20. man ʕamila→man ʕamila	مِنْ عَمَلٍ	(6: 45)	man 'amila
21. min ʕalaq→min ʕaləq	مِنْ عُلُقٍ	(96: 2)	min 'alaq
22. min ʕind→min ʕind	مِنْ عِنْدٍ	(2: 79)	min 'ind
23. min ʕajn→min ʕajn	مِنْ عَيْنٍ	(88: 5)	min 'ayn

II. Words ending in “Tanwīn”:

A. Within the same morpheme (in medial position):

No examples in the Holy Qur'an.

B. Across morpheme boundaries (in junctural position):

Word	In Arabic	Citation	Transliteration
1. kufwan ʔaḥad → kufwən ʔaḥəd	كفوا أحد	(112: 4)	kufwan aḥad
2. jawmaʔiḏīn ḫa:ʃiʃah → jawməʔiḏīn ḫa:ʃiʃah	يومئذ خاشعة	(88: 2)	yawma'idhin khāshi'ah
3. kullun ʔa:man → kullun ʔa:mən	كل آمن	(2: 285)	kullun 'āman
4. tidza:ratun ʔaw lahw → tidza:ratun ʔaw lahw	تجارة أو لهو	(62: 11)	tijāratun 'aw lahu
5. ʃuruban ʔatra:ba → ʃurubən ʔətra:bə	عرباً أتراباً	(56: 37)	'uruban 'atrāba
6. bislamin ʔa:mini:n → bislamin ʔa:mini:n	بسلام آمين	(15: 46)	bisālamin 'āminin
7. rasu:lun ʔami:n → rasu:lun ʔəmi:n	رسول آمين	(26: 107)	rasūlun 'amin
8. sala:mun hi:ja → salamun hi:jə	سلام هي	(97: 5)	salāmun hiya
9. qawmin ha:d → qawmin ha:d	قوم هاد	(13: 7)	qawmin hād
10. fari:qan hada → fari:qən hadə	فريقاً هدي	(7: 30)	fariqan hadá
12. dzurfin ha:r → dzurfin ha:r	جرف هار	(9: 109)	jurfīn hār
13. ʃali:mun ḥaki:m → ʃali:mun ḥaki:m	علم حكيم	(4: 26)	'alimūn ḥakīm
14. ʔafu:run ḥali:m → ʔafu:run ḥali:m	غفور حليم	(2: 225)	ghafūrun ḥalīm
15. ʔazi:zun ḥaki:m → ʔazi:zun ḥaki:m	عزيز حكيم	(2: 209)	'azīzun ḥakīm
16. narun ḥa:mijah → narun ḥa:mi:jəh	نار حامية	(101: 11)	nārun ḥāmiyah
17. ḥaki:mun ḥami:d → ḥaki:mun ḥami:d	حكيم حميد	(41: 42)	ḥakīmūn ḥamid
18. min ḥamaʔ → min ḥamaʔ	من حمأ	(15: 26)	min ḥama'
19. tidza:ratun ḥa:dirah → tidza:ratun ḥa:dirəh	تجارة حاضرة	(2: 282)	tijāratun ḥādirah

20. ʔafuwwan ʔafura→ʔafuwwən ʔafurə	عَفْوَا غَفُورَا	(4: 43)	'afuwwan ghafūra
21. ʔazi:zun ʔafu:r→ʔazi:zun ʔafu:r	عَزِيز غَفُور	(35: 28)	'azizun ghafūr
22. ʔila:hun ʔajruh→ʔila:hun ʔajruh	إِلَهِ غَيْرِهِ	(23: 32)	'ilāhun ghayruh
23. qawlan ʔajr→qawlən ʔajʔr	قَوْلَا غَيْر	(7: 162)	qawlan ghayr
24. ma:ʔan ʔadaqa→ma:ʔən ʔadeqə	مَاءَ غَدَقَا	(72: 16)	mā'an ghadaqa
25. ʔafuwwan ʔafu:r→ʔafuwwən ʔafu:r	عَفْوَا غَفُور	(4: 43)	'afuwwan ghafūr
26. min ʔa:liqin ʔajr ʔaḷḷah→min ʔa:liqin ʔajr ^u ḷah	مِنْ خَالِقٍ غَيْرِ اللَّهِ	(35: 3)	min khāliqin ghayruḷah
27. laṭi:fun ʔabi:r→laṭi:fun ʔabi:r	لَطِيفٍ خَبِيرٍ	(22: 63)	laṭifun khabīr
28. ʔali:mun ʔabi:r→ʔali:mun ʔabi:r	عَلِيمٍ خَبِيرٍ	(31: 34)	'alimun khabīr
29. ʔadzarun ʔaḏi:m→ʔadzərun ʔaḏi:m	أَجْرٍ عَظِيمٍ	(3: 172)	'ajrun 'azīm
30. sabʔun ʔidza:f→sabʔun ʔidza:f	سَبْعٍ عِجَافٍ	(12: 43)	sab'un 'ijāf
31. wa:sifun ʔali:m→wa:sifun ʔali:m	وَاسِعٍ عَلِيمٍ	(2: 115)	wasi'un 'alim
32. qurʔa:nan ʔarabijja→qurʔa:nən ʔarabijjə	قُرْآنًا عَرَبِيًّا	(12: 2)	qur'ānan 'arabiyya
33. ʔiraṭan ʔaljjamustaqi:mə→ʔiraṭən ʔaljjə mustaqi:mə	صِرَاطًا عَلِيًّا مُسْتَقِيمًا	(15: 41)	ʔiraṭan 'aliyyan mustaqima
34. sami:ʔun ʔali:m→sami:ʔun ʔali:m	سَمِيعٍ عَلِيمٍ	(2: 181)	sami'un 'alim
35. ʔajiʔin ʔali:m→ʔajʔin ʔali:m	شَيْءٍ عَلِيمٍ	(2: 29)	shay'in 'alim

2. ʔidghām (nasal assimilation):

I. Non-syllabic n

A. Across morpheme boundaries (in junctural position):

Word	In Arabic	Citation	Transliteration
1. man ʔaqu:l→mej ʔaqu:l	مَنْ يَقُولُ	(2: 8)	man yaqūl
2. min rabihim→mir rabihim	مِنْ رَبِّهِمْ	(2: 5)	min rabbihim
3. min wa:l→miw wā:l	مِنْ وَالٍ	(13: 11)	min wāl
4. min maldz aʔ→mīm maldz əʔ	مِنْ مَلْجَأٍ	(42: 47)	min malja'
5. ʔin nahnu→ʔīn nahnu	إِنْ نَحْنُ	(14: 11)	'in nahnu
6. man ʔaʔmal→maj ʔəʔməl	مَنْ يَعْمَلُ	(34: 12)	man ya'mal
7. min ladunhu→mil ladunhu	مِنْ لَدُنْهُ	(4: 40)	min ladunhu

8. min nafs→mīn nafs	من نفس	(4: 1)	min nafs
9. min ma:ʔ→mīm ma:ʔ	من ماء	(2: 164)	min māʾ
10. min rabbih→mir rabbih	من ربه	(2: 37)	min rabbih
11. man juʔmin→maǰǰuʔmin	من يؤمن	(9: 99)	man yuʾmin
12. min waljji→miw wāljjə	من ولي	(9: 74)	min waliyy
13. min naði:r→mīn naði:r	من نذير	(34: 44)	min nadhīr
14. min rajb→mir rajb	من ريب		min rayb
15. man juʔiʃ ʔaḷḷah→maǰǰuʔiʃ ilah	من يطع الله	(4: 80)	man yuʾṭī ilah
16. min ma:ʔin da:fiq→mīm ma:ʔin da:fəq	من ماء دافق	(86: 6)	min māʾin dāfiq
17. ʔan lan taqu:l→ʔaḷ lān taqu:l	أن لن تقول	(72: 5)	ʾan lan taqūl
18. min rasu:l→mir rasu:l	من رسول	(4: 64)	min rasūl
19. min ma:l ʔaḷḷah→mīm malila:h	من مال الله	(24: 33)	min malilāh
20. ʔan lan jaqdir→ʔaḷ lān jaqder	أن لن يقدر	(90: 5)	ʾan lan yaqdir
21. man jarḡab→maǰǰərḡab	من يرغب	(2: 130)	man yarghab
22. min niʕmah→mīn niʕmeh	من نعمة	(73: 11)	min niʾmah
23. min ma razaqna:hum→mīm marazəqna:hum	من ما رزقناهم	(2: 3)	min ma razaqnāhum
24. wa ʔin min ʕajʔ→wə ʔīm min ʕajʔ	وإن من شيء	(17: 44)	wa ʾin min shayʾ
25. min wa:q→miw wā:q	من واق	(13: 34)	min wāq
26. laʔin lam jantahi→laʔil lām jə:tahi	لئن لم ينته	(33: 60)	laʾin lam yantahi
27. min ribaʔ ʔaḷḷajl→mir ribaʔ ilḷajl	من رباط الحيل	(8: 60)	min ribāṭilkhayl
28. faʔin lam→fəʔil lām	فإن لم	(2: 24)	faiʾn lam

II. In Tanwīn:

A. Within the same morpheme (no words as such in LHQ)

B. Across morpheme boundaries (in junctural position):

Word	In Arabi c	Citation	Transliteration
1. wabarqun jadʒʕalu:n→wəberquǰǰədʒʕalu:n	وبرق يجعلون	(2: 19)	wa barqun yajʾalūn
2. ʕamaratin rizqa→ʕamaratir rizqə	ثمرة رزقا	(2: 25)	thamaratin rizqa
3. ʕa:milatin na:ʕibəh→ʕa:milatīn	عاملة ناصبه	(88: 3)	ʾamilatin naʕibah

na:šibah			
4. qawlun maʿru:f→qawlūm maʿru:f	قول معروف	(2: 263)	qawlun maʿrūf
5. xayrun wa ʿabqa→xayruw̄ w̄e ʿebqə	خير وأبقى	(28: 60)	khayrun wa ʿabqá
6. masbaʿatin jatiman→masbaʿatīj̄j̄et imān	مسبغة يتيمًا	(90: 14, 15)	masbaghatin yatīman
7. ʔamʃa:dʒin nabtali:h→ʔəmʃa:dʒīn nabtali:h	أمشاج بنتليه	(76: 2)	ʾamshājin nabtaliḥ
8. ʔala kulli ʃajʔin muqtadira→ʔalə k ullī ʃajʔīm muqtadire	على كل شيء مقتدرا	(18: 45)	ʾalá kulli shayʾin muqtadira
9. wa wa:lidin wa ma walad→wə wa:līdī w̄ w̄e ma waləd	ووالد وما ولد	(90: 3)	wa wālidin wa ma walad
10. xayran jarah→xayraḥj̄ j̄erəḥ	خيرًا يره	(99: 7)	khayran yarah
11. kullān numidu→kullān numīdu	كلًا عمد	(17: 20)	kullan numīdu
12. ʃuḥufan muṭaharah→ʃuḥufēm̄ muṭəḥ arəḥ	صحفا مطهرة	(98: 2)	ṣuḥufan muṭaharah
13. ʔihsa:nān watawfiqa→ʔihsa:nəw̄ w̄ ətawfiqə	إحسانًا وتوفيقًا	(4: 62)	iʾhsānan wa tawfiqa
14. wajlun likul→wajlul̄ likul	ويل لكل	(45: 7)& (104: 1)	waylun likul
15. ʔafurun raḥi:m→ʔafurur̄ raḥi:m	غفور رحيم	(2: 173)	ghafurun raḥīm
16. humazatin lumazah→humazatīl̄ lum azəḥ	همزة لمزة	(104: 1)	humazatin lumazah
17. ʔiʃatin ra:ḍijah→ʔiʃatīr̄ ra:ḍījəḥ	عيشة راضية	(69: 21) & (101: 7)	ʾiṣhatin raḍiyah
18. ma:lan lubada→ma:lāl̄ lubadə	مالًا لبادا	(90: 6)	mālan lubada
19. baʃaran rasu:la→baʃarər̄ rasu:lə	بشرًا رسولًا	(17: 93)	basharan rasūla
20. jawmaʔiḏin na:ʔimah→jawməʔiḏīn̄ n a:ʔīməḥ	يومئذ ناعمه	(88: 8)	yawmaʾidhin nāʾimah
21. wudzu:hun jawmaʔiḏin→wudzu:huḥj̄j̄ awməʔiḏīn	وجوه يومئذ	(88: 8)	wujuhun yawmaʾidhin
22. raḥimun wadu:d→raḥimuw̄ w̄adu:d	رحيم ودود	(11: 90)	raḥimun wadūd
23. raʔu:fun raḥi:m→raʔu:fur̄ raḥi:m	رؤوف رحيم	(9: 117)	raʾūfun raḥīm
³⁹ 24. jasi:n walqurrʔa:n→jasi:n wəlq urrʔa:n	يس والقرآن	(36: 1,2)	yasīn wal qurrʾān

³⁹ No gemination in this particular verse because “yaseen” is the name of the surah (chapter) and the n is a part of the root.

25. <u>xiṭaban jawm</u> → <u>xiṭabāḷ jawm</u>	خطاباً يوم	(78: 37, 38)	khīṭāban yawm
26. <u>hudan lilmutaqin</u> → <u>hudəl lilmutaq in</u>	هدى للمتقين	(2: 2)	hudan lilmuttaqīn
27. <u>rizqan naḥnu</u> → <u>rizqān naḥnu</u>	رزقاً نحن	(20: 132)	rizqan naḥnu
28. <u>ʔaḏa:ban muhina</u> → <u>ʔaḏa:bām muhine</u>	عذاباً ممينا	(4: 37)	ʔadhāban muhīna
29. <u>ṣira:tan mustaqima</u> → <u>ṣira:tām mustaqime</u>	صراطاً مستقيماً	(4: 68)	ṣirāṭan mustaqīma
30. <u>maʔrufun wamaʔfirah</u> → <u>maʔrufuṯ wəmaʔfirəh</u>	معروف ومغفرة	(2: 263)	maʔrūfun wa maghfirah
31. <u>jawmaʔiḏin</u> <u>jaṣdur</u> → <u>jawməʔiḏiḷ jaṣdur</u>	يومئذ يصدر	(99: 6)	yawmaʔidhin yaṣdur
32. <u>fasalamun lak</u> → <u>fəsalamul lek</u>	فسلام لك	(56: 91)	fasalāmun laka
33. <u>hiṭṭatun naʔfir</u> → <u>hiṭṭatūn naʔfir</u>	حطة نغفر	(2: 58)	hiṭatun naghfir
34. <u>maḏalan ma</u> → <u>maḏalēm me</u>	مثلاً ما	(2: 26)	mathalan ma
35. <u>raʔdun wabarq</u> → <u>raʔduṯ wəbarq</u>	رعد وبرق	(2: 19)	raʔdun wa barq
36. <u>jawmaʔiḏin jataḏakar</u> → <u>jawməʔiḏiḷ jataḏəkər</u>	يومئذ يتذكر	(89: 23)	yawmaʔithin yatadhakkar
37. <u>laʔaku:nan min</u> <u>aṣaʔirin</u> → <u>laʔaku:nēm min əsaʔirin</u>	ليكونا من الصاغرين	(12: 32)	layakunnana min aʔāghirīn

3) ʔiqlāb (nasal place assimilation):

I. Non-syllabic n:

A. Within the same morpheme (in medial position):

Word	In Arabic	Citation	Transliteration
1. <u>ʔanbiʔhum</u> → <u>ʔəmbiʔhum</u>	أنبيهم	(2: 33)	ʔanbiʔhum
2. <u>fanbadzasat</u> → <u>fəmbadzəsət</u>	فانبجست	(7: 160)	fanbajasat
3. <u>junbit</u> → <u>jūmbit</u>	ينبت	(16: 11)	yunbit
4. <u>ʔanba:ʔ</u> → <u>ʔāmba:ʔ</u>	أنباء	(3: 44)	ʔanbāʔ
5. <u>ʔalʔanbiʔa:ʔ</u> → <u>ʔəlʔāmbiʔa:ʔ</u>	الأنبياء	(3: 112)	alʔanbiyāʔ
6. <u>laʔjunbaḏanna</u> → <u>ləjūmbaḏenne</u>	لينبئ	(104: 4)	layunbadhanna
7. <u>ʔanbatat</u> → <u>ʔāmbatət</u>	أنبتت	(2: 261)	ʔanbatat
8. <u>ʔanbiʔuni</u> → <u>ʔəmbiʔuni</u>	أنبتوني	(2: 31)	ʔanbiʔuni

B. Across morpheme boundaries (in junctural position):

Word	In Arabic	Citation	Transliteration
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1. ʔan burika→ʔām burika	أن يورك	(27: 8)	'an būrika
2. min baʔdih→mīm baʔdirh	من بعده	(2: 51)	min ba'dih
3. min baʔd→mīm baʔd	من بعد	(2: 27)	min ba'd
4. munfaṭirun bih→munfaṭirūm birh	منفطر به	(73: 18)	munfaṭirun bih
5. man baḫal→māmbaḫəl	من بخل	(92: 8)	man bakhal

II. Words ending in Tanwīn:

A. Within the same morpheme (no words as such in LHQ)

B. Across morpheme boundaries (in junctural position):

Word	In Arabic	Citation	Transliteration
1. lanasfaʔan binnaṣjah→lənəsfeʔēm binnaṣjeh	لنسفاً بالناصيه	(96: 15)	lanasfa'an binnaṣiyah
2. ḫabiran baṣi:ra→ḫabirām baṣi:rə	خبراً بصيراً	(17: 17)	khabiran baṣīra
3. hani:ʔan bima→hani:ʔēm bime	هنيئاً بما	(52: 19)	hanī'an bima
4. sami:ʔan baṣi:ra→samīʔēm baṣire	سمياً بصيراً	(4: 134)	samī'an baṣīra
5. minʔilmin bilmalaʔ→minʔilmēm bilmalaʔ	من علم بالملأ	(38: 69)	min 'ilm bilmala'
6. maṣṣa:ʔin binami:m→maṣṣa:ʔīm binami:m	مشاء بميم	(68: 11)	mashshāi'n binamīm
7. zawdzin baḥi:ʔ→zawdzīm baḥi:ʔ	زوج بهج	(22: 5)	zawjin baḥij
8. munfaṭirun bih→munfaṭirūm birh	منفطر به	(73: 18)	munfaṭirun bih
9. radzman bilḫajb→radzmēm bilḫajb	رجماً بالغيب	(18: 22)	rajman bilghayb
10. sami:ʔun baṣi:r→samī:ʔūm baṣi:r	سميع بصير	(17: 1)	samī'un baṣīr
11. ʔali:mun biḏa:t→ʔalimūm biḏa:t	عليه بذات	(67: 13)	'alīmun bidhāt
12. mata:ʔan bilmaʔru:f→mataʔām bilmaʔru:f	متاعاً بالمعروف	(2: 236)	matā'an bilma'rūf
13. ʔa:jatin baijjina:t→ʔa:jatīm baijjena:t	آيات بينات	(2: 99)	'āyatin bayyināt

4. 'ikhfā' : nasal place assimilation

I. Non-syllabic n:

A. Within the same morpheme (in medial position):

Word	In Arabic	Citation	Transliteration
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1. j <u>an</u> surkum→ jēnşurkum	ينصرکم	(67: 20)	yansurkum
2. mun <u>ḏ</u> ir→ mūṇḏir	منذر	(38: 4)	mundhir
3. man <u>ṭ</u> u:rə→ māṇṭu:rə	منثورا	(76: 19)	manthūra
4. jank <u>i</u> ṭu:n→ jēṇkiṭu:n	يكنون	(7: 135)	yankithūn
5. ʔand <u>z</u> ajna:kum→ ʔēṇdzajna:kum	انحينام	(7: 141)	'anjaynākum
6. wa j <u>a</u> nşur→ wəjēṇşur	ويشتر	(42: 28)	wa yanshur
7. jan <u>q</u> alibu:n→ jēnqalibu:n	يقبلون	(26: 227)	yanqalibūn
8. min <u>s</u> aʔatah→ mīnsaʔetəh	منسأته	(34: 14)	minsa'atah
9. ʔan <u>d</u> a:də→ ʔēnda:də	اندادا	(2: 22)	'andāda
10. jan <u>t</u> iqu:n→ jēṇṭiqu:n	يتطقون	(21: 63)	yantiqūn
11. faʔan <u>z</u> alna→ fəʔēnzalnə	فانزلنا	(2: 59)	ʔanzalna
12. ʔin <u>f</u> iru→ ʔiṭwīfiro	انفروا	(9: 38)	'infirū
13. jan <u>t</u> ahu:→ jēntahu:	يتهاوا	(5: 73)	yantahu
14. man <u>ḏ</u> u:d→ māṇḏud	منضود	(56: 29)	mandūd
15. ʔun <u>ḏ</u> uru:→ ʔūṇḏuru:	انظروا	(6: 11)	'unzurū
16. ʔan <u>ṣ</u> arah→ ʔāṇṣarəh	انشره	(80: 22)	'ansharah
17. nan <u>s</u> aḫ→ nēnsaḫ	نسخ	(2: 106)	nansakh
18. fan <u>f</u> iru:→ fēwḥfīru:	فانفروا	(4: 71)	fanfirū
19. munt <u>a</u> hu:n→ mūntahu:n	متبون	(5: 91)	muntahūn
20. fan <u>ḏ</u> ur→ fēṇḏur	فانظر	(7: 84)	fanzur
21. man <u>ṣ</u> ura→ mānşure	منصورا	(17: 33)	manşūra
22. wa ʔan <u>ḏ</u> irhum→ wə ʔēṇḏirhum	وانذرهم	(40: 18)	wa 'andhirhum
23. ʔan <u>k</u> a:la→ ʔēṇka:lə	انكالا	(73: 12)	'ankāla
24. ʔand <u>z</u> ajna→ ʔēṇdzajnə	انحينا	(7: 165)	'anjaynākum
25. man <u>ṣ</u> u:ra→ māṇṣure	منشورا	(17: 13)	manshūra
26. ʔan <u>s</u> a:hum→ ʔēnsa:hum	انساهم	(59: 19)	'ansahum
27. ʔan <u>z</u> alnahu→ ʔēnzalnahu	انزلناه	(6: 92)	'anzalnahu
28. ʔan <u>f</u> usakum→ ʔēwḥfosakum	انفسكم	(2: 44)	'anfusakum
29. kun <u>t</u> um→ kūntum	كتم	(2: 23)	kuntum
30. jan <u>ḏ</u> uru:n→ jēṇḏuru:n	ينظرون	(7: 198)	yanzurūn

B. Across morpheme boundaries (in junctural position):

Word	In Arabic	Citation	Transliteration
1. ʔan ṣ <u>a</u> dduku:m→ʔān ṣaddukum	أن صدوكم	(5: 2)	'an ṣaddūkum
2. walaʔin <u>q</u> ult→wəlaʔīn qult	ولئن قلت	(11: 7)	wa la'in qult

3. waʔan sajaku:n→wəʔān səjəkun	وَأَنْ سَيَكُونُ	(73: 20)	wa 'an sayakūn
4. min da:bbah→mīn da:bbəh	مِنْ دَابَّةٍ	(11: 6)	min dābbah
5. min ti:n→mīn ti:n	مِنْ طِينٍ	(6: 2)	min tīn
6. faʔin zalaltum→fəʔīn zaləltum	فَإِنْ زَلَلْتُمْ	(2: 209)	fa'in zalaltum
7. waʔin fa:takum→wəʔīw fatakum	وَإِنْ فَاتَكُمْ	(60: 11)	wa'in fatakum
8. min tahtihe→mīn tahtihe	مِنْ تَحْتِهَا	(2: 25)	min tahtiha
9. ʔin dalalt→ʔīn dələlt	إِنْ ضَلَلْتَ	(34: 50)	'in dalalt
10. min ʔahi:r→mīn ʔahi:r	مِنْ ظَهْرِ	(34: 22)	min ẓahīr
11. min ʔaṣṣa:l→mīn ʔaṣṣa:l	مِنْ صُلَّالٍ	(15: 26)	min ʔaṣṣāl
12. man ʔallaḍi:→mān ʔə laḍi:	مَنْ ذَا الَّذِي	(2: 245)	man dha ladhi
13. fa ʔamma man ʔaqlat→fə ʔamma mān ʔaqlət	فَأَمَّا مَنْ ثَقُلَتْ	(101: 6)	fa'amma man thaqlat
14. faman kan→fə mān kan	فَمَنْ كَانَ	(2: 184)	faman kan
15. ʔin dza:ʔakum→ʔīn dza:ʔekum	إِنْ جَاءَكُمْ	(49: 6)	'in jā'akum
16. ʔin ʔa:ʔaḷḷah→ʔīn ʔa:ʔaḷḷah	إِنْ شَاءَ اللَّهُ	(2: 70)	'in shā'aḷḷah
17. faʔin qatalu:kum→fəʔīn qata:lukum	فَإِنْ قَاتَلُوكُمْ	(2: 191)	fa'in qatalūkum
18. min sula:lah→mīn sulaləh	مِنْ سُلَالَةٍ	(32: 8)	min sulālah
19. waman daḡalah→wə mān daḡələh	وَمَنْ دَخَلَهُ	(3: 97)	wa man dakhalah
20. min tajjba:t→mīn tajjba:t	مِنْ طَيِّبَاتٍ	(2: 57)	min ṭayyibāt
21. man zakkaha→mān zəkkahe	مَنْ زَكَّاهَا	(91: 9)	man zakkaha
22. min faḍal ʔaḷḷah→mīw fəḍəlilah	مِنْ فَضْلِ اللَّهِ	(12: 38)	min faḍlilāh
23. waʔin taṣbiru:→wəʔīn taṣbiru:	وَإِنْ تَصْبِرُوا	(3: 120)	wa 'in taṣbirū
24. min dari:ʔ→mīn dari:ʔ	مِنْ ضَرِيعٍ	(88: 6)	min dari'
25. man ʔalam→mān ʔaləm	مَنْ ظَلَمَ	(4: 148)	man ẓalam

II. Tanwīn:

A. Within the same morpheme (in medial position):

B. Across morpheme boundaries (in junctural position):

Word	In Arabic	Citation	Transliteration
1. riḥan ʔarṣara→riḥān ʔarṣare	رِيحاً صَرْصَرًا	(54: 19)	riḥan ʔarṣara
2. sira:ʔan ʔalik→siraʔān ʔalik	سِرَاعًا ذَلِكْ	(50: 44)	sirā'an thalik
3. dzami:ʔan ʔumma→dzami:ʔān ʔummə	جَمِيعًا ثُمَّ	(2: 29)	jamī'an thumma
4. ʔaw wanun kafu:r→ʔawwanūn kafu:r	خَوَانُ كُفُورٍ	(22: 38)	khawwānun kafūr

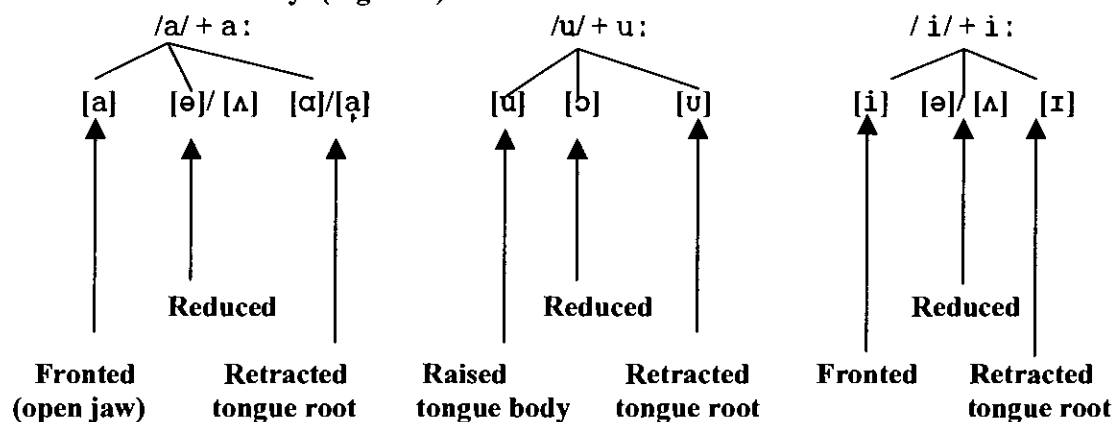
5. ʃajʔan dzadala→ʃajʔl̥n dzadələ	شيء جدلا	(18: 54)	shay'an jadala
6. ʔalimun ʃaraʔ→ʔalimūn ʃarəʔ	علم شرع	(42: 12, 13)	'alimūn shara'
7. sami:ʔun qari:b→sami:ʔūn qari:b	سمع قريب	(34: 50)	samī'un qarib
8. ʔaḏimun sammaʔu:n→ʔaḏimūn sammaʔu:n	عظيم سماعون	(5: 41, 42)	'azimūn sammā'ūn
9. qinwanun da:nijah→qinwanūn da:nijəh	قنوان دانيه	(6: 99)	qinwānun dāniyah
10. ʃafi:dan tajjibə→ʃafi:dān tajjibə	صعيداً طيباً	(4: 43)	ša'īdan ṭayyiba
11. jawmaʔiḏin zurqa→jawməʔiḏēn zurqə	يومئذ زرقاً	(20: 102)	yawma i'dhin zurqa
12. ʁa:lidan fi:ha→ʁalidāw fi:hə	خالداً فيها	(4: 14)	khālidan fiha
13. dzanna:tin tadzri:→dzanna:tīn tadzri:	جنات تجري	(4: 13)	jannātin tajrī
14. qawman da:li:n→qawmān da:li:n	قوماً ضالين	(23: 106)	qawman ḏālin
15. ḏillan ḏali:la→ḏillān ḏali:lə	ظلاً ظليلاً	(4: 57)	zilan zalila
16. ʃara:ban tahu:ra→ʃarabēn tahurə	شراباً طهوراً	(76: 21)	sharāban ṭahūra
17. ʃafi:dan zalaqa→ʃafidān zaleqə	صعيداً زلقاً	(18: 40)	ša'īdan zalaqa
18. ʃajʔan farijə→ʃajʔl̥w farijə	شيئاً فرياً	(19: 27)	shay'an fariyya
19. ḥiljatan talbasu:naha→ḥiljatēn təlbasu:nəhə	حليّة تلبسونها	(16: 14)	hilyatan talbasūnaha
20. quran ḏa:hirah→qurēn ḏahireh	قرآن ظاهره	(34: 18)	quran zāhirah
21. sira:ʔan ḏa:lik→sira:ʔl̥n ḏa:lik	سراً ذلك	(55: 44)	sira'an dhalik
22. muṭa:ʔin ḡamma→muṭaʔiṇ ḡamə	مطاع ثم	(81: 21)	muṭā'in ṭamma
23. kira:man ka:tibi:n→kira:mēn ka:tibi:n	كراماً كاتبين	(82: 11)	kirāman katibin
24. faṣabrun dzami:l→faṣəbrūn dzami:l	فصير جميل	(12: 18)	faṣabrun jamil
25. rasu:lan ʃa:hidan→rasu:lān ʃa:hidən	رسولاً شاهداً	(73: 15)	rasūlan shāhidan

26. kutubun qajjimah→kutubūn qajjiməh	کُتُب قَیْمَہ	(98: 3)	kutubun qayyimah
27. ʔa:bida:tīn sa:ʔiħa:t→ʔa:bida:tīn sa:ʔiħa:t	عَابِدَاتٍ سَالِحَاتٍ	(66: 5)	'ābidātin sā'ihāt
28. biri:ħin şarşar→birīħīn şarşar	بَرِیْحٍ صَرَصَر	(69: 6)	birīħin şarşar
29. jawmin ōi→jawmīn ōi	یَوْمٍ ذِی	(90: 14)	yawmin dhi
30. qawlan ōaqi:la→qawlān ōaqi:lə	قَوْلًا ثَقِیْلًا	(73: 5)	qawlan thaqila
31. ʔadzarun kari:m→ʔadzərūn kari:m	أَجْرٍ کَرِیْمٍ	(57: 11)	'ajrun karīm
32. xalqan dzadi:də→xalqēn dzadi:də	خَلْقًا جَدِیدًا	(17: 49)	khalqan jadida
33. dzabbaran ʃaqijjə→dzabbarēn ʃaqijə	جَبَّارًا شَقِیًّا	(19: 32)	jabbaran shaqiyya
34. ʔafuwwan qadi:rə→ʔaffuwēn qadi:rə	عَفْوًا قَدِیرًا	(4: 149)	'afuwwan qadira
35. başaran sawijja→başarān sawijə	بَشَرًا سَوِیًّا	(19: 17)	basharan sawiyya
36. nafsān zakijjah→nafsān zakijjəh	نَفْسًا زَکِیَّةً	(18: 74)	nafsān zakiyyah
37. musaxxara:tīn fi→musaxxara:tīw fi	مَسْخَرَاتٍ فِی	(16: 79)	musaxkharaṭin fi
38. likulin dīff→likulīn dīf°f	لِکُلِّ ضَعْفٍ	(7: 38)	likullin dīf

Appendix 3. Sound inventory of the LHQ
IPA version of segment Inventory of (LHQ)
Table (1): Consonant Inventory

Place	Bi-labial	Labio-dental	Dental	Denti-alveolar	Alveolar	Post-alveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	ب b			ت t د d ط ṭ ض ḍ				ك k	ق q		ء ʔ
Nasal	م m				ن n						
Trill					ر r						
Fricatives		ف f	ث θ ذ ḏ ظ ṭh		س s ز z ص ṣ	ش ṣh			خ ḫ غ ġ	ح ḥ	ه h
Affricate						ج dʒ					
Approximant	و w						ي j			ع ʕ	
Lateral Approximant					ل l						

Vowel inventory: (Figure 2)



Some allophonic variations are

Diphthongization

i → eⁱ in the environment of pharyngeals and uvulars

i → i^e



The Pattern employed

● مد - حرکات	● مُنْهَ - حرکات	● لا يُنْهَ - حرکات	● شَدِيد (R)	● URAH
Normal prolongation 2 vowels	Nasalization (ghunnah) 2 vowels	Un announced (short)	Emphatic pronunciation of the letter (R)	Unrest letters (Echoing Sound)
Prolongation normale de 2 voyelles	Nasalization (ghunnah) de 2 voyelles	Non pronounced	EMPHASIS DE LA LETTRE (R)	CONSONANTES EMPHATYQUES
2 A T O T A B P O N O U R U R U 3 J S S R A	2 A T O T A B P O N O U R U R U 3 J S S R A	2 A T O T A B P O N O U R U R U 3 J S S R A	2 A T O T A B P O N O U R U R U 3 J S S R A	2 A T O T A B P O N O U R U R U 3 J S S R A
Prolongation normal 2 movimientos	Prolongation 2 movimientos	No se pronuncia	ENFASIS DE LA LETRA (R)	CONSONANTES ENFATICAS
2 Vokale langziehen (durch die Nase sprechen)	2 Vokale langziehen (durch die Nase sprechen)	Es wird nicht ausgesprochen	Emphasis der Buchstabe (R)	Funktion Konsonant
2 حرکات والى مد	2 حرکات والى مد	2 حرکات والى مد	2 حرکات والى مد	2 حرکات والى مد
2 حرکات والى مد	2 حرکات والى مد	2 حرکات والى مد	2 حرکات والى مد	2 حرکات والى مد
2 Harakat	2 Harakat	2 Harakat	2 Harakat	2 Harakat
MAD 2 HARAKAT	MAD 2 HARAKAT	MAD 2 HARAKAT	MAD 2 HARAKAT	MAD 2 HARAKAT

المنهج المستعمل

● مد 9 حرکات اورما	● مد واجب 4 حرکات	● مد 2 حرکات 6 حرکات	● مد 2 حرکات 6 حرکات
Necessary prolongation 6 vowels	Obligatory prolongation 4 of 5 vowels	Permissible prolongation 2,4,6 vowels	Permissible prolongation 2,4,6 vowels
Prolongation necessaire de 6 voyelles	Prolongation obligatoire de 4 ou 5 voyelles	Prolongation permise de 2,4 ou 6 voyelles	Prolongation permise de 2,4 ou 6 voyelles
2 A T O T A B P O N O U R U R U 3 J S S R A	2 A T O T A B P O N O U R U R U 3 J S S R A	2 A T O T A B P O N O U R U R U 3 J S S R A	2 A T O T A B P O N O U R U R U 3 J S S R A
Prolongation normale 6 movimientos	Prolongation obligatoire 4, 5 movimientos	Prolongation probable 2,4,6 movimientos	Prolongation probable 2,4,6 movimientos
6 Vokale langziehen erforderlich	4 oder 5 Vokale lang- ziehen, obligatorisch	2,4, oder 6 vokale langziehen, zulässig	2,4, oder 6 vokale langziehen, zulässig
6 حرکات والى مد لازم	4 حرکات والى مد واجب	2,4, 6 حرکات والى مد	2,4, 6 حرکات والى مد
6 حرکات والى مد لازم	4 حرکات والى مد واجب	2,4, 6 حرکات والى مد	2,4, 6 حرکات والى مد
6 Harakat	4 Harakat	2,4, 6 Harakat	2,4, 6 Harakat
MAD 6 HARAKAT	MAD 4 HARAKAT	MAD 2,4,6 HARAKAT	MAD 2,4,6 HARAKAT

IDENTIFICATION OF THIS HOLY QURAN

With Allah's aid and after several years of assiduous labor, the publishing of this Holy Quran has been fulfilled in order to guide reciters how to intone it according to Haf's narration from A'assim, from Othman, from Ali Ibn Abi Talib, Zaid Ibn Thabit and Ubay Ibn Ka'ab from Muhammad's recitation.

The following is the pattern employed:

The dark red colour ●: Indicates necessary prolongation, six vowels each of which is about half a second.

Example: مَاجِدٌ - الَمَ

The blood red colour ●: Indicates obligatory prolongation, five vowels: it comprises non-stop prolongation, separate and major link.

Example: مَاجِدٌ - الَمَ

The orange red colour ●: Indicates permissible prolongation, two or four or six vowels. It pertains to vowelless consonants and soft prolongation.

Example: عَظِيمٌ - الْأَنْبِيَاءُ - لَيَقُولُونَ - خَوْفٌ

The cumin red colour ●: Indicates certain cases or normal prolongation, it belongs to what scribes left in the Ottoman copy of the Holy Quran and it takes two vowels duration.

Example: يَسْتَعِيذُ - دَاوُدُ

The green colour ●: Indicates nasalization which is the sound that comes out of the

nose; it continues as long as two vowels.

It comprises:

Nasalized contraction (Idgham bi ghunnah): مَسْمُورٌ - عَذَابٌ مُّهِينٌ

Disappearance (Ikha'f'a): مَسْمُورٌ - عَذَابٌ مُّهِينٌ

Inversion (Iqlab): مَسْمُورٌ - عَذَابٌ مُّهِينٌ

- stressed -N- and -M-: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

N.b. nasalization is always recommended if it is in a separate word; but if it is connected with what comes before or after, it is recommended only when there is non-stop.

The grey colour ●: indicates what is un-announced

a. what is never pronounced:

1. The assimilated "L": مَسْمُورٌ - عَذَابٌ مُّهِينٌ

2. The incompatible: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

3. The (alef) of discrimination: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

4. The conjunctive hamza within a word: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

5. The position of the omitted alef: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

6. Inversion within a word: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

b. Unpronounced contracted and inverted letters:

1. Contracted (n), (nunation): مَسْمُورٌ - عَذَابٌ مُّهِينٌ

2. The (n) which is inverted into (m): مَسْمُورٌ - عَذَابٌ مُّهِينٌ

3. The letter which is relatively contracted: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

4. The letter which is approximately contracted: مَسْمُورٌ - عَذَابٌ مُّهِينٌ

The dark blue colour ●: indicates the emphatic pronunciation of the letter (R): مَسْمُورٌ - عَذَابٌ مُّهِينٌ

The blue colour ●: indicates the unrest letters

- echoing sound - (qualqala): مَسْمُورٌ - عَذَابٌ مُّهِينٌ

Appendix 5.

Crucial constraint ranking

Max- μ >> RM
 Max- μ >> Ident-OO [nasal]
 Max- μ >> *Obs.Gem.
 RM >> *Son. Gem.
 RM >> Max [nasal]
 RM >> * \tilde{V}
 RM >> *V_{ORAL}N
 *V_{ORAL}N >> * \tilde{V}
 *Nas. Liquid >> RM
 RM >> Ident [place]
 Max- μ >> * \tilde{V}
 Max- μ >> Ident [place]

*Obs.Gem. >> Max [nasal]
 *Obs.Gem. >> * \tilde{V}
 *Obs.Gem. >> Ident [place]
 \tilde{V} (N) >> RM
 *Phary.Gem. >> RM