N-Behavior in Quranic Reading

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Abstract

*Idgham is a Quranic-reading rule that governs how the coronal /n/ is pronounced when it is followed by a set of segments: /j, w, r, l, n and m/. According to Quranic scholars, when /n/ is followed by a glide /famə**n j**aʔməl/ or a nasal /mɪ**n m**al/, it deletes and the [+nasal] feature moves to the following segment yielding [famə **j̃**aʔməl] and [mɪ **m̃**al], respectively. On the other hand, when /n/ precedes a liquid, both the /n/ and the [+nasal] feature are phonetically unrealized: /mɪ**n l**adunh/ →[mɪ **l**adunh]. Idgham only applies when /n/ occurs word-finally and the triggering segments occupy the initial onset position of the following word. It does not occur word-medially: [qɪ**nw**an].The present paper provides a unified OT account for the phenomenon illustrated above. Since, in most cases, the [+nasal] feature sticks around, I argue that Idgham is a fusion process not a deletion process. This paper also explores the vulnerability of /n/ and the immunity of /m/ to Idgham: /la**m** nara/ "we did not see" → [la**m** nara] not *[la $ñ_{1,2}$ara]. I argue that in Quranic reading, the more marked /m/ is exempt from fusion while the less marked /n/ is not because IDENT constraints for the more marked segment /m/ outrank IDENT constraints for the less marked segment /n/ (De Lacy, 2002). Finally, in answering why /n/ only fuses with sonorants, the reason is attributed to faithfulness.*

Key words: Idgham, fusion, coronal nasal, Quranic reading

1 Introduction*

Given its idiosyncratic interaction with some segments in particular environments, the phonological behavior of the coronal nasal /n/ in different languages has been given an ample attention in the literature (Halle & Clements, 1983; Herrick, 1999; Lombardi, 1998; Pater, 1999). In the religion of Islam, the holy Quran (the sacred book of Muslims) should be read according to a set of rules, and mistakes in recitation are forbidden (Muhammad, R, Muhammad, A & Martinez-Enriquez, 2010). The way Quran should be read is governed by a set of rules referred to as "Tajweed"[1]. One of those rules is *Idgham* which is a rule that governs how the coronal nasal /n/ is pronounced when it is followed by a set of segments: /*j*, *w*, *r*, *l*, *n* and *m*/.

According to Qamawee (1985) and Nassr (1994), when /n/ is followed by a glide or a nasal, it deletes and the [+nasal] feature moves to the following segment. On the other hand, when /n/ precedes a liquid, both the segment and the feature are phonetically unrealized. *Idgham* only applies when /n/ occurs word-finally and the triggering segments occupy the initial onset position of the following word. The co-occurrence of /n/ with one of the triggers word-medially does not trigger *Idgham*. Finally, *Idgham* does not occur when names of Quranic Surahs[2] participate in providing an *Idgham* environment.

Idgham is prescriptive and not a natural part of speakers' native grammars. We can view it as akin to a language game (Gotowski, 2019). This makes the present analysis similar to formal analyses of other language games. The main purpose of the present paper is to provide a unified OT account for the phenomenon illustrated above with all its different facets. I argue that *Idgham* is a coalescence process derived by an interaction between well-attested markedness constraints and faithfulness constraints from Correspondence Theory (McCarthy and Prince, 1995). In particular, it is a fusion process driven by an interaction between a constraint against a specific sequence of consonants and faithfulness constraints for particular positions and particular features. This paper also tackles and develops an OT account for the vulnerability of /n/ and the immunity of /m/ to *Idgham*. The coronal nasal undergoes *Idgham* when it is followed by one of the triggers. *Idgham*, on the other hand does not affect /m/ when it is followed by the same triggers. The immunity of /m/, I argue, is due to a highly ranked faithfulness constraint that holds only for labials. The paper is concluded by throwing some light on why /n/ only coalesces with sonorants.

This paper is organized as follows: section 2 provides a unified OT account for *Idgham*. It is divided into five subsections: 2.1 deals with examples in which /n/ is followed by a glide, 2.2 tackles the tolerance of /n/ followed by one of the *Idgham* triggering segments word-medially, 2.3 explains what happens when /n/ is followed by a nasal, 2.4 is devoted for the co-occurrence of /n/ with a liquid, 2.5 demonstrates the blocking of *Idgham* in the names of Quranic Surahs where the environment is *Idgham*-motivated. Section 3 dwells on the nature of segments involved in *Idgham*. It is divided into two subsections: 3.1 explores the

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[1] Tajweed is an Arabic word that means proper pronunciation during recitation (Ibrahim, Razak, Yusoff, Idris, Tamil, Noor, & Naemah, 2008).

[2] Surah is the term used for a chapter in the Quran.

vulnerability of /n/ and the immunity of /m/ to *Idgham* while 3.2 touches on sonorants as *Idgham* triggering segments. Section 4 concludes.

2 A unified OT account for *idgham*

2.1 /n/ followed by a glide

In Quranic reading, when /n/ is followed by a glide, it deletes and the [+nasal] feature moves to the following glide[3] (Qamawee, 1985 and Nassr, 1994).

1) a. **nj**

/wa barqə**n** **j**ad͡ʒʔalun/	[wa barqə **j̃**ad͡ʒʔalun]	"and thunder they make"
/famə**n** **j**aʔməl/	[famə **j̃**aʔməl]	"and he who works"
/mə**n** **j**aqul/	[mə **j̃**aqul]	"who says"
/wa mə**n** **j**utəʔ allah/	[wa mə **j̃**utəʔ allah]	"and he who obeys Allah"
/wud͡ʒuhu**n** **j**awmaʔðɪn/	[wud͡ʒuhu **j̃**awmaʔðɪn]	"faces on that day"
/jawmaʔðɪ**n** **j**ataðakər/	[jawmaʔðɪ **j̃**ataðakər]	"on that day he/ she will remember"

b. **nw**

/mɪ**n** **w**alli/	[mɪ **w̃**alli]	"apart from God you have no guardian"
/jawmaʔðɪ**n** **w**ahijah/	[jawmaʔðɪ **w̃**ahijah]	"on that Day it will be frail"
/mɪ**n** **w**al/	[mɪ **w̃**al]	"apart from God you have no guardian"
/wa walɪdə**n** **w**a ma walad/	[wa walɪdə **w̃**a ma walad]	"and by a father and what he fathered"
/mɪ**n** **w**aq/	[mɪ **w̃**aq]	"no defender against God"

I argue that the phonological process that /n/ undergoes in the abovementioned examples is not deletion, but rather coalescence. This is supported by the fact that the [+nasal] feature appears on the glide indicating that /n/ is not deleted but fused with the glide. This argument, as will be discussed in detail in the subsequent sections, holds whenever /n/ is followed by any of the 6 *Idgham* triggering segments /*j*, *w*, *r*, *l*, *n* and *m*/. The difference lies in the preservation or loss of the coronal /n/'s [+nasal] feature depending on the nature of the following segment[4].

[3] (All data translations are cited from https://www.clearquran.com/)

[4] It is possible to come up with an account that treats the behavior of /n/ when it is followed by a liquid differently from when it is followed by the rest of the triggers. However, in this paper, it is argued that the loss

Prior to exploring what motivates *Idgham*, let's touch on the nature of the triggering segments. Scrutinizing the nature of the triggering segments */j*, *w*, *r*, *l*, *n* and *m*/, it is clear that all of them are sonorants. It seems that in Quranic reading, the sequence (n + sonorant) is not allowed. The ban on [nS] (where S = sonorant) sequence is resolved by fusion. When a word underlyingly contains a sequence of /nS/, these two segments coalesce surfacing as one output segment standing in correspondence to the two input segments /nS/.

In Optimality Theoretic terminology, fusion occurs when the anti-fusion faithfulness constraint UNIFORMITY[5] is dominated by the markedness constraint *NS and the other faithfulness constraints, namely, MAX-IO (C) and DEP-IO (V). The definitions of the constraints are given below.

2) UNIFORMITY: Nothing in the output can have more than one correspondent in the input; penalizes coalescence.

3) *NS: The sequence nasal + sonorant must not be allowed; penalizes consecutive [nasalSonorant][6].

4) MAX-IO (C): Every consonant in the input must have a correspondent in the output; penalizes consonant deletion

5) DEP-IO (V): Every vowel in the input must have a correspondent in the output; penalizes vowel deletion.

Tableau 1: Motivating Idgham

famən$_1$ j$_2$aʔməl	MAX-IO (C)	DEP-IO (V)	*NS	UNIFORMITY
a.→famə j̃$_{1,2}$aʔməl				*
b. famən$_1$ j$_2$aʔməl			*!	
c. famənə jaʔməl		*!		
d. famə jaʔməl	*!			

The most faithful candidate (b) is ruled out by incurring a fatal violation of *NS. Candidates (c) and (d) are ruled out by violating the highly-ranked faithfulness constraints DEP-IO (V) and MAX-IO (C), respectively. The winner (a) satisfies the undominated constraints by fusion of the unpermitted sequence; the cost, though, is a violation of UNIFORMITY which is ranked low in the hierarchy.

of /n/'s [+nasal] feature when it is followed by a liquid stems from a lower ranking of the constraint responsible for the preservation of the feature as will be seen in 2.4.

[5] Unless stated otherwise, the constraints used in this paper are from Correspondence Theory (McCarthy and Prince, 1995). When the source of a constraint is not stated, it means that it is developed specifically for purpose of accounting for the present data.

[6] The examples show that the sequence (n/+ sonorant) is banned which is resolved by fusion. However, it is worth noting that this constraint bans the sequence nasal + sonorant. Broadening the constraint this way will come in handy later when we deal with the immunity of the bilabial nasal /m/.

There are still two more important suboptimal forms that need to be incorporated in our analysis: *[famən$^{j}_{1,2}$ aʔməl] and *[famə j$_{1,2}$aʔməl]. In *[famən$^{j}_{1,2}$ aʔməl], the coalescence goes the other way around resulting in a palatalized [n^{j}] whereas in *[famə j$_{1,2}$aʔməl], the two input segments /n j/ coalesce yielding a nonnasalized [j$_{1,2}$] which indicates that the [+nasal] feature is deleted. No constraint in the analysis developed thus far can rule out these two suboptimal forms.

Dealing with *[famən$^{j}_{1,2}$ aʔməl] where the resultant of the fusion process is a palatalized [n^{j}], it is noticeable that both the surface form [famə j̃$_{1,2}$aʔməl] and the candidate with a palatalized [n^{j}] only violate UNIFORMITY out of the constraints developed so far. This means that there is a tie between these two candidates. To break the tie, we need a constraint that is violated by *[famən^{j}aʔməl], but not by the winner.

In all of the examples mentioned above, the 6 triggering segments occupy a position where they are followed by a vowel which is not the case for /n/. This environment can be used to the winner's advantage. In [famə j̃$_{1,2}$aʔməl], the glide precedes a vowel and all of the features of the glide are preserved plus an addition of the feature [+nasal]. On the other hand, in *[famən$^{j}_{1,2}$ aʔməl], all of the features of the glide are lost except for [dorsal] while all the features of the /n/ are preserved with the addition of [dorsal]. What we need here is an output segment that is faithful to the input segment preceding the vowel. In other words, when there is a conflict between two consonants, the features of the one preceding the vowel must be preserved.

In order to do that, we need to go through the feature mismatches between the glide and the /n/ and turn them into IDENT constraints. These IDENT constraints are going to be bundled in a cover constraint: Faith-C/ _V (cf. Becker, 1999). The same set of IDENT constraints are going to be bundled in another cover constraint: Faith-C. The latter is more general as it is not restricted to a specific environment. Faith-C/ _V is violated when one of the IDENT constraints is violated by the consonant preceding the vowel. When Faith-C/ _V is violated, Faith-C is also violated but not the reverse.

The features in which the glide and the /n/ mismatch are: [vocalic], [approximant], [continuant], [labial], [dorsal], [nasal], and [coronal]. We are going to set the nasal feature aside because we will need it later to rule out the candidate *[famə j$_{1,2}$aʔməl]. All of the remaining feature mismatches are going to be turned into IDENT constraints and grouped into Faith-C/ _V and Faith-C.

Tableau 2: [n^{j}] blocking

famən$_{1}$ j$_{2}$aʔməl	**Faith-C**	**Faith-C/ _V**
a.→famə j̃$_{1,2}$aʔməl	*	
b. famən$^{j}_{1,2}$ aʔməl	*	*

Candidate (b) is harmonically bound by candidate (a). The winner does not violate Faith-C/ _V because all of the features of the consonant that precedes a vowel which is in our case the glide are preserved with the exception of [nasal], whose Ident constraints are not included in our cover constraints. The reason the winner violates Faith-C is that the fusion resultant [j̃] is [-coronal] which violates IDENTCoronal for /n/, and /n/ is not followed by a vowel.

That is why only Faith-C is violated but not Faith-C/ _V. Candidate (b), on the other hand, violates both constraints. The fusion resultant [n^j] violates all of the IDENT constraints of the glide except for IDENTDorsal, and the glide precedes a vowel. This incurs a violation of Faith-C/ _V which means that Faith-C is also violated.

Turning to the other suboptimal form that needs to be ruled out by our analysis *[famə $j_{1,2}$aʔməl], in this form the two input segments /n j/ coalesce yielding a nonnasalized [$j_{1,2}$] indicating that the [+nasal] feature is deleted. As mentioned above, the nasal feature is not included in the cover constraints in tableau (2). This gives us the liberty to state that the [+ nasal] feature cannot be deleted due to the activation of the faithfulness constraint MAX-NAS. The ranking of this constraint with respect to Faith-C/ _V and Faith-C does not need to be specified yet.

6) MAX-NAS: If the input has a [+nasal] feature, it must not be deleted in the output.

Tableau 3: [+nasal] preservation

famən$_1$ j$_2$aʔməl	**Faith-C**	**Faith-C/ _V**	**MAX-NAS**
a.→famə j̃$_{1,2}$aʔməl	*		
b. famən$^j_{1,2}$ aʔməl	*	*!	
c. famə j$_{1,2}$aʔməl	*		*!

Candidate (c) violates Faith-C for the same reasons candidate (a) violates it. However, Candidate (c) is now harmonically bounded by the winner since it violates MAX-NAS which is not violated by the winner.

2.2 NS tolerance word-medially

Idgham only applies when /n/ occurs word-finally and the triggering segments occupy the initial onset position of the following word. The co-occurrence of /n/ with one of the triggers word-medially does not trigger *Idgham* (7). In Quran, there are only four words where /n/ is followed by one of the 6 *Idgham* triggers word-medially, and in each case the *Idgham* trigger is a glide (Qamawee, 1985 and Nassr, 1994).

7) a. **Root-internal nw**

/qɪ**nw**an/	[qɪ**nw**an]	"hanging clusters of palm trees"
/si**nw**an/	[si**nw**an]	"from the same root"

b. **Root-internal nj**

/addu**nj**a/	[addu**nj**a]	"the life"
/bu**nj**an/	[bu**nj**an]	"in ranks"

From an Optimality Theoretic perspective, the tolerance of the sequence [nS] root-internally occurs when the anti-fusion faithfulness constraint LINEARITY (8) dominates the markedness constraint *NS. It worthwhile to highlight that words are assumed to be unordered in the input, so Linearity doesn't apply to them and doesn't block coalescence across word boundaries.

8) LINEARITY: If A comes before B in the input, A should come before B in the output

Tableau 4: Root-internal NS tolerance

qɪnwan	**LINEARITY**	***NS**
a. →qɪnwan		*
b. qɪw̃an	*!	

Candidate (b) loses because it incurs a fatal violation of the higher raked constraint LINEARITY. The winner violates *NS but it is not a fatal violation because this constraint is outranked by LINEARITY which is violated by the suboptimal form.

2.3 /n/ followed by a nasal

In Quranic reading, when /n/ is followed by a nasal, it deletes and the [+nasal] feature moves to the following segment (Qamawee, 1985 and Nassr, 1994).

9) a.**nn**

/wa la**n** **n**uʃrɪk/	[wa la **ñ**uʃrɪk]	"we will never associate anyone with our Lord"
/mɪ**n** **n**aʔməh/	[mɪ **ñ**aʔməh]	"seeking no favor in return"
/la**n** **n**adxulaha/	[la **ñ**adxulaha]	"we will never enter it"
/amʃad͡ʒɪ**n** **n**abtalih/	[amʃad͡ʒɪ **ñ**abtalih]	"we created man from a liquid mixture, to test them"

b. **nm**

/mɪ**n** **m**al/	[mɪ **m̃**al]	"any money"
/ʔaðabu**n** **m**uqim/	[ʔaðabu **m̃**uqim]	"a lasting torment"
/mɪ**n** **m**aʔən dafɪq/	[mɪ **m̃**aʔən dafɪq]	"from gushing liquid"
/sɪrata**n** **m**ustaqɪm/	[sɪrata **m̃**ustaqɪm]	"a straight path"

It is argued, in this paper, that /n/ coalesces with the following nasal. Example set (9, a) shows that /n/ fuses with the following /n/ yielding an output segment [n] which corresponds to both of the input segments /nn/. In example set (9, b), /n/ fuses with the following /m/ resulting in [m] which stands in correspondence to both of the input segments /nm/.

As for the nasal feature of the input segment at the end of the first word, Quranic scholars including Qamawee, (1985) and Nassr, (1994) argue that in Quran reciting, when /n/ is followed by a nasal, it deletes and the following nasal is overnasalized[7]. The overnasalization (represented by tilde [~] in the examples) of the fusion resultant indicates two things: 1- it is a fusion process 2- the overnasalization of the following nasal is a result

[7] This might be tested acoustically which is out of the scope of this study. It is worth highlighting that overnasalization is different from lengthening. Overnasalization here simply means that the resultant consonant is produced with a lower velum and with much more air coming out through the nose than it is with usual nasal consonants. The motivation for overnasalization stems from the desire to preserve the [+nasal] feature of the fused segment.

of having two [+nasal] features. The analysis developed so far coincides with what Quranic scholars have proposed in terms of feature preservation as will be shown momentarily. Our analysis preserves both [+nasal] features of the two input segments. It already predicts the right outcome: MAX-NAS preserves both [+nasal] features. The following tableau includes all the relevant constraints discussed thus far as well as all the possible candidates. The tableau will be discussed in detail below.

Tableau 5: n + nasal candidates and preservation of nasal features

mɪn$_1$ m$_2$al	**MAX-IO (C)**	**DEP-IO (V)**	***NS**	**Faith-C**	**Faith-C/ _V**	**MAX-NAS**	**UNIFORMITY**
a.→ mɪ m̃$_{1,2}$al				*			*
b. mɪn mal			*!				
c. mɪ mal	*!						
d. mɪnə mal		*!					
e. mɪñ$_{1,2}$ al				*	*!		*
f. mɪ m$_{1,2}$al				*		*!	*

The ranking between MAX-IO (C), DEP-IO (V), *NS and Faith-C needs to be specified. The constraints MAX-IO (C), DEP-IO (V) and *NS must dominate Faith-C because the winner violates both Faith-C and UNIFORMITY whereas candidates (b), (c), and (d) only violate one constraint each: *NS, MAX-IO (C) and DEP-IO (V), respectively. Candidate (b) is ruled out by incurring a fatal violation of the markedness constraint *NS. The suboptimal forms (c) and (d) are ruled out by violating the highly-ranked faithfulness constraints MAX-IO (C) and DEP-IO (V), respectively.

Candidates (e) and (f) are harmonically bound by the winner. Comparing the winner with candidate (f), we can see that both of them violate UNIFORMITY because the output segment [m$_{1,2}$] stands in correspondence to the input segments /n$_1$ m$_2$/. However, candidate (f) violates MAX-NAS since the [+nasal] feature of the input segment /n/ disappeared. The winner does not violate MAX-NAS because the fusion resultant output segment [m̃] preserves both its own [+nasal] feature and the /n/'s [+nasal] feature shown by the nasalization diacritic [~]. This parallels with what has been proposed by Quranic scholars regarding feature preservation.

Comparing candidate (e) with the winner, both violate UNIFORMITY since in both cases one output segment corresponds to two input segments. The winner only violates Faith-C while candidate (e) violates both Faith-C and Faith-C/ _V. The feature mismatches between /m/ and /n/ are: [coronal] and [labial] where /m/ is [+labial] while /n/ is [+coronal]. These two features are turned into IDENT constraints and bundled into the two faith constraints: Faith-C and Faith-C/ _V. The winner preserves all the features of consonant preceding a vowel which is /m/ in our case with the addition of the [+nasal] feature of /n/ which is not among the IDENT constraints grouped into Faith-C and Faith-C/ _V as explained earlier. The winner only preserves the [+nasal] feature of the input segment /n/. The [+coronal] feature of the underlying segment /n/ is lost which in turn violates Faith-C but not Faith-C/ _V because /n/ is not followed by a vowel. Candidate (e), on the other hand, preserves all the features of /n/ with the addition to the [+nasal] feature of the underlying segment /m/. The

[+ labial] feature of /m/ is lost which incurs a violation of Faith-C/ _V because /m/ underlyingly precedes a vowel. It is worth repeating that incurring a violation of Faith-C/ _V will automatically violate Faith-C but not the other way around. This makes candidate (e) violate both constraints, and thus candidate (e) loses.

2.4 /n/ followed by a liquid

In Quranic reading, when /n/ is followed by a liquid, both the segment and the [+nasal] feature disappear (Qamawee, 1985 and Nassr, 1994). This makes it different from the previous triggering segments since with liquids the [+nasal] feature is phonetically unrealized.

10) a. **nl**

/jawmaʔðɪ**n** **l**axbir/	[jawmaʔðɪ **l**axbir]	"their Lord, on that Day, is fully informed of them"
/fasalmu**n** **l**ak/	[fasalamu **l**ak]	"then, Peace upon you”
/mɪ**n** **l**adunh/	[mɪ **l**adunh]	"from him"
/malla**n** **l**ubada/	[malla **l**ubada]	"so much money"
/huda**n** **l**ɪlmutaqin/	[huda **l**ɪlmutaqin]	"these are upon guidance from their lord”

b. **nr**

/mɪ**n** **r**abbɪk/	[mɪ **r**abbɪk]	"from your god"
/ʁafuru**n** **r**aħim/	[ʁafuru **r**aħim]	"God is Forgiving and Merciful"
/wa θamaratu**n** **r**isqa/	[wa θamaratu **r**isqa]	"fruit there from as sustenance"
/mɪ**n** **r**abbɪhɪm/	[mɪ **r**abbɪhɪm]	"from their god"
/mɪ**n** **r**asul/	[mɪ **r**asul]	"any prophet"

The ranking so far predicts fusion, and the only task is to prevent the [+nasal] feature from surviving in this case. What prevents the [+nasal] feature from appearing on the fusion resultant output liquid is a highly ranked markedness constraint that militates against nasalized liquids: *L̃ (11). Given the marked status occupied by nasalized liquids, this constraint Penalizes nasalized liquids.

11) *L̃: Nasalized liquids must not be allowed.

This constraint interacts with the faithfulness constraint that militates against deleting the [+nasal] feature: MAX-NAS. The deletion of the [+nasal] feature when /n/ fuses with a following liquid occurs when the liquid anti-nasalization constraint *L̃ dominates MAX-NAS.

Tableau 6: Nasalized liquid blocking

mɪn$_1$ l$_2$adunh	*L̃	MAX-NAS
a. → mɪ l$_{1,2}$adunh		*
b. mɪ l̃$_{1,2}$adunh	*!	

Candidate (b) is ruled out by incurring a violation of *L̃ which outranks the constraint violated by the winner MAX-NAS.

No ranking between MAX-NAS and Faith-C/ _V has been established yet; this must change now. The reason the ranking between these two constraints must be specified is that the winner violates MAX-NAS while this candidate *[mɪn$_{1,2}$ adunh] does not. If MAX-NAS which is violated by the winner happens to be above Faith-C/ _V which is violated by *[mɪn$_{1,2}$ adunh] but not by the winner, *[mɪn$_{1,2}$ adunh] would win. This is because all of the other constraints violated by this form is also violated by the winner as the next tableau shows. Therefore, Faith-C/ _V must outrank MAX-NAS. The following tableau shows how the relevant possible candidates fail when they are passed through the constraints. Only the surface form survives through the hierarchy. For time and space purposes, the most faithful candidate will not be included in the following tableau as it is ruled out by the highly ranked *NS as illustrated earlier. The candidates that satisfy *NS by deleting a consonant or epenthesizing a vowel will not be included either as they are ruled out by the highly ranked faithfulness constraints MAX-IO (C) and DEP-IO (V), respectively. The tableau will be discussed in detail below.

Tableau 7: n + liquid candidates and deletion of nasal features

mɪn$_1$ l$_2$adunh	*L̃	Faith-C/ _V	MAX-NAS	Faith-C	Uniformity
a.→ mɪ l$_{1,2}$adunh			*	*	*
b. mɪ l̃$_{1,2}$adunh	*!			*	*
c. mɪn$_{1,2}$ adunh		*!		*	*

Candidate (b) is ruled out early by incurring a fatal violation of the liquid anti-nasalization constraint *L̃. Comparing candidate (c) with the winner, the winner violates MAX-NAS because the [+nasal] of the underlying /n/ is deleted. It also violates Faith-C but not Faith-C/ _V. The reason the winner only violates Faith-C but not Faith-C/ _V is because all of the features of the segment preceding a vowel which is the liquid are preserved on the fusion resultant [l$_{1,2}$] (the features are [+approximant] and [+continuant]. The feature [+lateral] is not included because /r/ is an *Idgham*-triggering liquid and it is not [+lateral]). This does not hold for /n/ as it has lost all of its features by fusing with the following liquid which causes the winner to violate Faith-C (the features lost are [-approximant] and [–continuant]. Remember: the nasal feature is not included in the faith constraints). Candidate (c) violates both of the faith constraints because all of the features of the segment preceding a vowel which is the liquid are lost on the fusion resultant output segment [n$_{1,2}$] (note that violating

Faith-C/ _V means violating Faith-C too). The fact that Faith-C/ _V is ranked higher than MAX-NAS rules out candidate (c).

2.5 NS tolerance in the names of Quranic surahs

Quran is divided into Surahs and verses. In Quranic terminology, Surah is the term used for a chapter in the Quran. Each Surah has a name. In some cases, the name of the Surah is used inside some verses. Only found in two cases of the whole Quran that the last segment of the name of the Surah is /n/ and the following onset of the subsequent word is one of the *idgham* triggering segments. In these two cases, *Idgham* is not triggered. In other words, when a name of a Surah participates in making an *idgham*-motivated environment, fusion is not triggered (Qamawee, 1985 and Nassr, 1994). The underlying /n/ occupying the last coda position does not fuse with the following onset of the subsequent word because it is advised by Quranic scholars that names of Surahs are read carefully, clearly and slowly without any fusion of any segments (Qamawee, 1985 and Nassr, 1994).

12) /jasi**n w**a alquran/ “jasin [name of Surah]. By the wise Quran”
/nu**n w**a alqalam/ “Nun [name of Surah]. By the pen”

The blocking of fusion when a name of a surah participates in making an *idgham*-motivated environment occurs when Faith-Surah outranks the constraint that bans the sequence [nS]: *NS.

13) Faith-Surah: A cover constraint for all the faithfulness constraints, relativized for Surahs.

Tableau 8: Fusion blocking in names of Surahs

nun wa	**Faith-Surah**	***NS**
a. → nun wa alqalam		*
b. nu w̃a alqalam	*!	

Candidate (a) wins because candidate (b) applies fusion in a name of a Surah which violates the higher ranked Faith-Surah.

3 The nature of segments involved in *idgham*

3.1 The vulnerability of /n/ and the immunity of /m/ to *idgham*

This subsection tackles the following question: why is /n/ vulnerable to *Idgham* while /m/ is immune to it? Put differently, both /n/ and /m/ are nasals, why is /m/, unlike /n/, *Idgham* resistant? The coronal /n/ undergoes fusion when it is followed by the fusion triggering sonorants discussed above. However, the labial /m/ is exempt from fusion when it is followed by the same set of segments. The underlying phrase /lam nara/ “we did not see” would surface faithfully without fusing /m/ with /n/: [lam nara].

The coronal nasal fusion with a following sonorant is not trigged by a shared place of articulation. If that was the reason, the labial nasal would be better-equipped to fuse with /w/. This also would go against fusing /n/ with /m/ since they do not share the same place of articulation.

De Lacy (2002) proposed a Major Place of Articulation Scale in which dorsals are more marked than labials while labials are more marked than coronals. In the scale, glottals are the least marked. Some languages tend to preserve more marked segments but not less marked segments. Less marked segments undergo certain phonological processes while more marked segments are exempt from these processes. In Catalan, the coronal /n/ place-assimilates to the following segment whereas the dorsal /ŋ/ and the labial /m/ do not (Herrick, 1999). A similar process occurs in Yamphu. Coda coronal stops /t/ and /t:/ undergo debuccalization and become [ʔ] whereas the more marked /p/ and /k/ do not (De Lacy, 2002). I argue that the same applies to the labial /m/ and the coronal /n/ in Quranic reading. The more marked /m/ is exempt from fusion while the less marked /n/ is not.

Following De Lacy's (2002) analysis but with a simpler version, I propose that IDENT constraints for the more marked segment /m/ must outrank IDENT constraints for the less marked segment /n/. These constraints interact with *NS. IDENTLabial (14) which prevents changing the feature values of a labial must outrank *NS. On the other hand, IDENTCoronal (15) which militates against changing the feature values of a coronal is ranked low in the hierarchy: IDENTLabial >> *NS >> IDENTCoronal.

14) IDENTLabial: Penalizes changing the feature values of a labial.

15) IDENTCoronal: Penalizes changing the feature values of a coronal.

The following tableaux show how the ranking between these constraints predicts the right outcomes.

Tableau 9: Tolerance of changing coronal feature values

mɪn₁ m₂al	**IDENTLabial**	***NS**	**IDENTCoronal**
a. → mɪ m̃$_{1,2}$al			*
b. mɪn mal		*!	

The winner violates IDENTCoronal which is ranked low in the hierarchy because the coronal feature values of the underlying coronal /n/ are changed. Candidate (b) loses because it incurs a fatal violation of *NS.

Tableau 10: Intolerance of changing labial feature values

lam$_1$ n$_2$ara	**IDENTLabial**	***NS**	**IDENTCoronal**
a. → lam nara		*	
b. la ñ$_{1,2}$ara	*!		

The fusion resultant output segment of candidate (b) [ñ$_{1,2}$] is [-labial], therefore, IDENTLabial is fatally violated which rules out this candidate. The winner has a sequence of m + sonorant, but, given the constraints ranking provided, this violation is not as serious as fusing /m/ with /n/.

There is still one more candidate to take into consideration: *[lam̃$_{1,2}$ ara]. This candidate only violates IDENTCoronal. Given the constraints we have so far, *[lam̃$_{1,2}$ ara] would win. To rule out this candidate, the constraint Faith-C/ _V must come into play. This constraint, as illustrated earlier, militates against changing the feature values of the consonant preceding a vowel. In order to produce the right outcome, it must outrank *NS. This ranking does not contradict the ranking established earlier.

Tableau 11: Intolerance of changing word-initial consonant's place feature

Lam$_1$ n$_2$ara	**Faith-C/ _V**	**IDENTLabial**	***NS**	**IDENTCoronal**
a. → lam nara			*	
b. lam̃$_{1,2}$ ara	*!			*

Candidate (b) loses by incurring a fatal violation of Faith-C/ _V. It is violated because the place feature of the underlying coronal /n/ which precedes a vowel is lost. The fusion resultant segment [m̃$_{1,2}$] is [+labial] and [-coronal].

Preserving the more marked segment in Quranic reading is also supported by another Tajweed rule: *Iqlab*. *Iqlab* is a rule that governs how the coronal /n/ is pronounced when it precedes the voiced labial stop /b/. According to Qamawee, (1985) and Nassr, (1994) and many other Quranic scholars, when /n/ precedes /b/, it assimilates in place to /b/: /mɪ**n** **b**aʔdi/ [mɪ**m** **b**aʔdi] "after" (for more examples on this phenomenon see Qamawee, 1985 and Nassr, 1994). The undelaying coronal /n/ place-assimilates to the following /b/ and becomes [m]. However, going along the lines with Catalan place assimilation highlighted earlier, an underlying /m/ would not assimilate in place with a following voiced coronal stop /d/: /θu**m** **d**ana/ →[θu**m** **d**ana] not *[θu**n** **d**ana] "then he came closer". This indicates that our analysis is on the right track and it works across all Tajweed rules.

3.2 Sonorants as *idgham*-triggering segments

This subsection attempts to briefly explain why the coronal /n/ fuses with sonorants but not with other classes of segments. Fusion with sonorants seems to be determined by faithfulness. When /n/ fuses with a sonorant, the resultant output segment would be a sonorant since both the /n/ and the trigger are sonorants. However, if /n/ fused with a nonsonorant segment, the resultant output segment would be faithful to only one of the involved segments in terms of the feature [sonorant]. In other words, the resultant output of fusing /n/ with a nonsonorant would be either a sonorant /n/ which would not be faithful to the other nonsonorant involved in the fusion process or a nonsonorant which would be unfaithful to the sonorant /n/ involved in the fusion process. Ident(sonorant) seems to be high-ranking which is, I believe, why /n/ only fuses with sonorants.

4 Conclusion

This paper thoroughly explores *idgham* and briefly touches on *Iqlab*; two Tajweed rules that govern how the coronal /n/ is pronounced in Quranic reading. The subsections that fall under section 2 focus on *idgham* (the way /n/ is pronounced when it is followed by */j,w, m, n, r* and *l/*) and provide a unified OT account for *idgham* regardless of what segment follows /n/. I argue that *Idgham* is a fusion process driven by an interaction between a constraint against a specific sequence of consonants and faithfulness constraints for particular positions and particular features. Section 3 covers the nature of the segments involved in *idgham*. The subsection 3.1 discusses the vulnerability of /n/ and the immunity of /m/ to *Idgham* and develops an OT account for that. I propose that IDENT constraints for the more marked segment /m/ must outrank IDENT constraints for the less marked segment /n/. That is why the more marked segment /m/ is exempt from fusion. This is supported by *Iqlab* where /n/ assimilates in place to the following /b/ which is not the case when /m/ is followed by /d/. The subsection 3.2 explains briefly why /n/ fuses only with sonorants but not with other segments. This fact is attributed to faithfulness. When /n/ fuses with a sonorant, the resultant is a sonorant which is not the case if /n/ fused with a nonsonorant segment because the resultant would be faithful to only one of the involved segments.

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Quranic data translations are taken from https://www.clearquran.com/

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