A phonetically "unnatural" class in Central and Eastern Shehret (Jibbali)

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The set of consonants /b m y/ and historical *w in the Central and Eastern varieties of the Modern South Arabian language, Shehret (Jibbali), pattern together phonologically in the following ways: all are subject to intervocalic elision; between underlying /e/~/i/ and a stressed mid vowel, /b/ patterns with /m/ in being realised as [y]~[əy] in a range of words; /y/ is the reflex of historical *b in a closed set of lexemes; and /b/ realises historical *w, rarely *y, in pre- and post-consonantal position and in a handful of lexemes word-initially.

Phonological interest in the set, /b m y/ *w, lies in the fact that the member consonants form a phonetically "unnatural" class (Mielke 2008): they do not include all and only labial consonants (lacking /f/, including /y/) nor all and only sonorants (lacking /l n r/, including /b/), including /b/), and two members of the set, /b y/, share no phonetic characteristics beyond 'voice.' Moreover, it is rare cross-linguistically for one obstruent to be subject to intervocalic elision to the exclusion of all other obstruents of that phonological class. Phonetically "unnatural" classes such as this are far from uncommon cross-linguistically (Mielke 2008), however; within Mielke's (2008) Emergent Feature Theory, they can be accounted for by the pressures of phonetics and "external" factors. In this paper, we consider the patterning of /b m y/ *w, examine phonetic reasons for the inclusion of the plosive, /b/, in this set, and, based on Emergent Feature Theory, present a phonological account of the patterning of /b m y/ and *w.

1. Introduction[1]

This paper examines a phonetically "unnatural" class in Shehret (Jibbali), a Modern South Arabian language with approximately 50,000 speakers that is spoken in Dhofar in southern Oman, focussing on

varieties of Central and Eastern Shehret. /b m y/ and historical *w in Shehret pattern together phonologically in that as singleton consonants they are typically elided within the prosodic word in intervocalic position (Dufour 2016: 27, 37, 39–44).[2] Additionally, subsets of consonants within this group pattern together in other ways both synchronically and diachronically: within the prosodic word, /b m/ between underlying /e/~/i/ and a following stressed mid vowel may be realised as [y]~[əy]; /y/ is the reflex of historical *b in a closed set of lexemes; and /b/ realises historical *w and occasionally *y in consonant-adjacent positions and, in the case of *w, in a handful of lexemes word-initially.

The set, /b m y/ *w is of phonological interest in that the member consonants form a phonetically "unnatural" class in the sense of Mielke (2008): they include neither all labial consonants (lacking /f/, including /y/) nor all sonorants (lacking /l n r/, including /b/), and two members of the set, /b y/, share no phonetic characteristics beyond 'voice.' Thus, they fail to meet the characteristics of a phonetically natural class: 'A group of sounds in an inventory which share one or more phonetic properties, to the exclusion of all other sounds in the inventory' (Mielke 2008: 12); however, phonetically "unnatural" classes such as this are far from uncommon cross-linguistically (Mielke 2008); within Mielke's Emergent Feature Theory, they can be accounted for by the pressures of phonetics and "external" factors. The creation of this phonetically unnatural class in Shehret appears to have arisen both through the tendency of word-medial /b/ to lenite post-lexically, becoming more sonorant-like, and through a series of generalisations involving phonetic similarity at each stage (cf. Culicover 1970, cited in Mielke 2009). In this paper, we consider the patterning of /b m y/ and *w, examine phonetic reasons for the inclusion of the obstruent, /b/, in this set, and, based on Emergent Feature Theory, present a phonological account of the patterning of /b m y/ and *w.

The paper is structured as follows: Section 2. presents the consonantal phonemic inventory, highlighting the consonants of this class. Section 3. examines the patterning of /b/ with /m y/ *w in terms of intervocalic elision; Section 4. examines diachronic reflexes of *b, *y, *w: /y/ as the reflex of

[2] Dufour, together with Johnstone (1981) and Rubin (2014), also includes /w/ as a synchronic phoneme in the language spoken in Central and Eastern regions, and notes: '/w/ comme /y/ chute en position intervocalique et donne lieu à des contractions : T2 ACC.3ms *əðtél* 'protéger' (√ðwl, schème əC1teC2éC3)' (Dufour 2016: 27). On account of /w/ in these varieties occurring as [w] only in the emphatic particle *wɔ́!* and words derived from Arabic loanwords or from Mehri, such as *dwil* 'old,' we include *w in this discussion only as a historical phoneme.

historical *b and *y, and /b/ as the reflex of historical *w and *b; Section 5. examines the patterning of /b/ with /m/ in taking the allophone [y]~[əy] (IPA [j]); Section 6. presents phonetic reasons for the inclusion of /b/ within this unnatural class; and Section 7. presents a phonological account of the patterning of /b/ with /m y/ and *w.

Our data are taken from first-hand fieldwork conducted between 2013–2016 during the Documentation and Ethnolinguistic Analysis of Modern South Arabian (DEAMSA) project (RPG-2012-599), funded by a Leverhulme Trust Project Grant, and from wordlists constructed in 2021 by the authors during the Phonetics and Phonology of Mehri and Shehret project funded by a Leverhulme Major Research Fellowship (MRF-2018-121). Data was checked with speakers of Central, Central Western and Eastern Shehret. The acoustic work on continuity lenition of /b/ was conducted in collaboration with Gisela Tomé Lourido and Barry Heselwood with assistance from Andrea Boom and Carlos Jair Martínez Albarracín during the Phonetics and Phonology of Mehri and Shehret project.

2. Consonantal phoneme inventory and transcription conventions

Table 1. provides the consonant inventory of Shehret, with the consonants subject to intervocalic lenition highlighted:

	labial	dental	alveolar	post-alveolar	alveo-palatal	palatal	velar	uvular	pharyngeal	glottal
plosive	b		t d ṭ				k g³ ḳ			
fricative	f	ṯ ḏ ṯ	s z ṣ	š	s̃ z̃ ṣ̃			x ġ	ḥ ʿ	h ʾ
lateral fricative			ś ź ṣ́							
lateral sonorant			ʰl l							
nasal	ʰm m		ʰn n							
rhotic			ʰr r							
glide	*w					y				

Table 1. Shehret consonantal phoneme table

Following the tradition of Johnstone (1981), a tilde over 's' or 'z' represents alveo-palatal sibilants with accompanying lip pouting and top lip raising (Bellem and Watson 2017); the hachek over 's' represents the palato-alveolar sibilant; an acute accent over 's' or 'z' represents a lateral articulation; a subscript

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[3] Among some speakers in Eastern and Central Dhofar, /g/ has the reflex /ʤ/, transcribed in this paper as /j/.

dot represents emphasis in the case of oral obstruents and beneath 'h'—the 'breathed' (voiceless) pharyngeal fricative. Stress in data examples is marked by an acute mark over the stressed vowel. In this paper, the mid back rounded vowel is transcribed as /o/ rather than Johnstone's /ɔ/, owing to the lack of phonological contrast between [o] and [ɔ]. We follow Heselwood and Watson (2021) in assuming the laryngeal categories 'breathed' and 'unbreathed' for Shehret rather than the traditional 'voiceless' and 'voiced,' wherein 'breathed' denotes canonically 'voiceless' consonants while 'unbreathed' denotes both canonically 'voiced' consonants and the emphatics. This is due to the fact that 'voiced' and emphatic consonants pattern together morphophonologically, that 'voiceless' fricatives subject to assimilatory voicing exhibit breathy voice, thus maintaining their breathiness even when 'voiced,' and that the relevant distinction between 'voiceless,' on the one hand, and 'voiced' and emphatic, on the other, has been shown in our Laryngographic work to be based on free flow of air versus impeded flow of air (Heselwood, Tomé Lourido and Watson 2022).

3. Intervocalic elision

In Shehret, singleton /b m y/ *w are typically not attested between phonological vowels[4] within a lexical stem, by which we mean a non-affixed vocalised nominal or verbal stem, or across certain morphemes,[5] resulting in long vowels as a result of compensatory lengthening (cf. Rubin 2014: 28–34; Dufour 2016: 27). In case of intervocalic elision of /m/, the resulting vowel is nasalised. In the examples presented here, inflected forms which exhibit elision are compared to inflections from the same lexeme in which elision does not take place, where attested. Reconstructed underlying forms are preceded by *. Root consonants are presented in slanted brackets, and reconstructed roots in slanted brackets preceded by *. Morphological glossing following the Leipzig glossing conventions are provided in square brackets before the translation for morphologically complex forms. Examples 1.a–c show intervocalic /b/ elision; examples 1.d–f show intervocalic /m/ elision; examples 1.g–i show intervocalic /y/ elision; and examples 1.j–k *w elision. Note example 1.f where the 'breathed' nasal /ʰm/ is subject to intervocalic lenition:

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[4] Before or following a non-phonological intrusive vowel (Hall 2006), /b m y/ are not subject to elision, as seen for /b/ in Section 5 below.

[5] Stem-final /b m y/ frequently elide in the following cases: in the perfect verb before the 3fs subject suffix; in the unmarked perfect verbal stem (3ms, 3pl) before an object suffix; stem-initial /b m y/ elide after the definite article prefix; stem-final /b m y/ may be maintained where a singular noun takes a possessive pronoun; stem-final /b m y/ frequently fail to be elided when a plural noun, in particular, takes a possessive pronoun.

1.a   *ġolə̄́t* [refuse.3FS.PERF] 'she refused' cp. *ġolób* 'to refuse' *ġolob-ót

  b   *ī* [DEF.father.1S] 'my father' cp. *ib* 'father' *ib-i

  c   *ēr díd-i* [DEF.son paternal_uncle-1S] 'my paternal cousin' cp. *ber díd* 'paternal
       cousin' *ɛ-ber díd

  d   *zaḥə̄́t* [come.3FS.PERF] 'she came' cp. *zaḥám* 'to come' *zaḥam-út

  e   *ĩndíḳ* [DEF.gun] 'the gun' cp. *mindíḳ* 'gun' *e-mindíḳ

  f   *yũi ṭrút* [day.DU two.F] 'two days' cp. *yuʰm* 'day' *yuʰm-i ṭrút

  g   *ġotɛ̄́ṯ* [be_angry.3FS.PERF] 'to be angry' cp. *aġyéṯ* 'to anger' (Central, cp. Eastern
       aġbéṯ) *ġoteyəṯ

  h   *ṣinɪ́t* 'deaf f.s.' *ṣiniyét

  i   *ġɛ̄g* 'men' *ġəyóg

  j   *ṓṣi* 'to advise' *ɛwóṣi

  k   *əḏtēl* 'to protect' *əḏtewél

Intervocalic elision rarely occurs across prosodic words, such that /b m/, for example, are maintained in word-final position in *ḏheb ɛ-ś́ʕayb* [flood of-wadi] 'wadi flood' and *ṓrəm ɛ-yɛl* [DEF.path of-camels] 'the path of the camels' and in word-initial position in *o bek śe lo* [with you.MS. thing NEG] 'there is nothing wrong with you m.s.' and in *ḏaʰn ɛ-muʰn* [this.M. of-whom] 'whose is that?.' A few cases in which /b m/ elision occurs across syntactic words are given by Rubin (2014: 29) for /b/ and (2014: 32) for /m/; however, the majority of these involve the accusative marker *t-* plus object pronoun, which cannot occur independently and is bound within the prosodic word of the preceding verb, as in: *slə̄́ to* 'wait m.s. for me!' < *slob to*, *o təḳrɛ̄́ to lo* 'don't approach me!' <*o təḳreb to lo, *zaḥū̃ to* 'come m.s. to me!' < *zaḥam to. Interest in these forms lies in the fact that /b m/ elision occurs pre-consonantally rather than intervocalically. *inɛ̄́n* 'which' < *inɛ́ min [what of] also forms a single prosodic word with one main instance of word stress. In traditional personal names in Central Shehret, less commonly in Eastern Shehret, word-initial /m/ is elided following the vocative *ɛ-* (2.a–c) and word-final /m/ is elided as the first term of an apposition or attribution phrase (2.d–g); word-final /m/ is also elided in frequent phrases such as *selũ ɛ-ʕofēt* [greeting of-well-being] 'greetings of well-being' (Noor al-Mashani, p.c.).

2.a   *ɛ̄̃ná* [voc.Mina] 'Mina!' < *a-maná

  b   *ĩzún* [voc.Mizun] 'Mizun!' < *ɛ-mizún

  c   *ɛ̄̃ḥū̃́d* [voc.Muhammad] 'Maḥū̃d!' < *ɛ-məḥáməd

  d   *sɛ̄l ã-ġ-í* [Selim DEF-brother-1s] 'my brother Selim' < *sɛ̄ləm aġi

e   *məsέl ã-ġ-í* [Musalm DEF-brother-1s] 'my brother Musalm < *məsέləm aġi

f   *sɛ̄l ã-ʕófər* [Selim DEF-red.MS] 'Selim the Red [personal name]' < *sɛ̄ləm aʕófər

g   *sɛ̄l ã-ḥɔ́r* [Selim DEF-black.MS] 'Selim the Black [family name]' < *sɛ̄ləm aḥɔ̄r

According to our consultants, word-initial and word-final /b/ in personal names do not elide in these cases.

There are a few cases in which intervocalic /b m/ elision either fails to apply or alternates with /b m/ maintenance. Where /m/, at least, heads a syllable with a long vowel resulting from intervocalic /y/ elision, elision fails to apply, as in: *ġamɛ̃́déni* 'shortly before sunset.' In the case of plural, and some singular, nouns with possessive pronoun suffixes, stem-final /b m/ are either maintained or elided intervocalically with variation by dialect or speaker.[6] In cases of variation, some of our consultants suggest that /b m/ elision is the more traditional form. 3.a–c provide examples of /m/ maintenance; 3.d provides an example of variable /m/ maintenance or elision; 3.e provides an example of /b/ maintenance, to be compared with the same lexeme in 3.f. 3.f–h provide examples of variable /b/ maintenance or elision:

3.a   *ɔ́rəm-i* [DEF.way-1s] 'my way'

b   *ɛ̃́m-í* 'my mother' [DEF.mother-1s], *ɛ̃́m-áhum* [DEF.mother-3MPL] 'their m. mother'

c   *diráhəm-ɛ̃́k* [money.PL-2MS] 'your m.s. money'

d   *herũ̃-i~herúm-í* [plant-1s] 'my plant,' *herũ̃-kum* [plant-2MPL] 'your m.pl. plants' cp. *herúm* 'plant'

e   *ṭarób-í* [sticks-1s] 'my sticks'

f   *ṭarób-ɔ́hum~ ṭar-ɔ́hum* [sticks-3MPL] 'their m. sticks'

g   *kaʕ-ɔ́hum~kaʕayb-ɔ́hum~kaʕib-ɔ́hum* [things-3MPL] 'their m. things[7] cp. *kaʕayb* 'things'

h   *núśub-i~núśu-i* [milk-1s] 'my milk' cp. *núśub* 'milk'

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[6] Rubin (2014: 30, 32) claims that /b/ and /m/ (/y/ is not mentioned here) are maintained between two stressed vowels of different quality. Our fieldwork indicates that stem-final /b m y/ maintenance does not depend on vowel quality but rather relates to the morphology and the closeness of certain suffixes to the stem.

[7] Eastern Shehret variable; Central Shehret /b/ elision. According to the second author, a speaker of Eastern Shehret, the form with /b/ elision is preferred by older speakers.

/y/ maintenance intervocalically most frequently occurs before a pronominal suffix, as in 4.a–b; however, it may also occur within a stem between two full vowels, as in 4.c-d; in the case of 4.c, /y/ results from historical *b.

4.a	*hōy-ɔ́kum* [snakes-2MPL] 'your m.pl. snakes'	
b	*ṯuy-ɛ́sɛn* [sheep.PL-3FPL] 'their f. sheep'	
c	*ʕayɛ́l* 'flint'	
d	*ʕayúʰn* 'years' cp. *ʕɔ̄n-út* [year-S] 'year'	

In Section 4., we consider the diachronic reflexes of *b *m *y *w.

4. Diachronic reflexes

4.1. /y/ as reflex of historical *b and *y

/y/ functions as the reflex of *b in a closed set of nouns: of these, 5.a–c have an historical root-initial glottal stop, and /y/ realises *b both in word-initial and intervocalic position following the definite article:

5.a	*yit* 'camel f.' (root */ʔ-b-l/)[8]	*e-yit* [DEF-camel.FS] 'the camel'
b	*yɛl* 'camels f.' (root */ʔ-b-l/)	*e-yɛl* [DEF-camel.FPL] 'the camels'
c	*yɔ̄* 'people' (root */ʔ-b-w/)	*e-yɔ̄* [DEF-people] 'the people'
d	*ʕayɛ́l* 'flint' (root */ʕ-b-l/)	cp. Mehri *ʕībēl*

In the examples 5.a–c, the root-initial historical glottal stop is lost, leaving a bi-consonantal root. /y/ also functions as the reflex of historical *y in a small closed-set of words root-initially (6.a–b), in the imperfect masculine prefix *yə-* (6.c), which alternates with *i-,* and in root-final position (6.d–e):

6.a	**y**uʰm 'sun; day'
b	**y**ɔ̄l 'towards'
c	**y**ə-ssɔ́x-ən [3M-waste_money-IND] 'he is wasting money, property on useless things'

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[8] /t/ functions as the feminine marker, and we assume that *l is elided pre-consonantally, as occurs in a closed set of words in Shehret, e.g. *tof* 'hunger' versus *telf* 'to be hungry,' *dof* 'rock' versus *dilóf* 'rocks' (cf. Rubin 2014: 35–36).

d   *ḥəl**y**ɛ́t* 'disaster' (root /ḥ-l-y/)

e   *hɔ̄**y*** 'snakes' (root */h-w-y/)

Thus, *y* functions both as the reflex of historical *b, and as a phoneme in its own right.

4.2. /b/ as reflex of historical *w

With a few exceptions (see 5. and 6. above for *y),[9] historical *w and *y have no consonantal realisation in word-initial position (Rubin 2014: 33 for *w); *w, and in verbs *y, have no consonantal realisation in word-final position (cf. Rubin 2014: 202), as in 7.:

7.a   *ɛ́gəh* 'face' (root */w-g-h/)

b   *aġád* 'to go' (root */w-ġ-d/)

c   *id̠bér* 'hornet' (root /y-d̠-b-r/)

d   *ɛ̄ml-í* [right-ADJ] 'right' (root /y-m-l/)

e   *béke* 'to cry,' *y-ɔ̄k* [3M-cries.IND] 'he cries' (root /b-k-y/)

f   *śíni* 'to see,' *yə-śún* [3M-sees.IND] 'he sees' (root /ś-n-y/)

g   *fśe* 'to have lunch,' *yəfóś* [3M-have_lunch.IND] 'he has lunch' (root /f-ś-w/)

As the right- or left-hand leg of a consonant cluster, however, historical *w[10] has the reflex /b/ (Rubin 2014: 34; Dufour 2016: 27).[11] 8.b *yəbġód* 'he goes' in which *w is realised word-medially as /b/ can be compared to 7.b *aġád* 'to go' in which *w has no consonantal reflex in word-initial position:

8.a   *śɛbr* 'view, opinion' (root */ś-w-r/)

b   *yə-bġód* [3M-go.IND] 'he goes' (root */w-ġ-d/)

c   *ḥabz* 'boundary mark' (root */ḥ-w-z/)

d   *məġábzəl* 'large flocks of goats, sheep' *məġawzəl*

e   *ksb-ɛ́t* [clothes-S] 'clothes' (root */k-s-w/)

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[9] A few exceptions are attested in which word-initial *w has a consonantal reflex: *bē* 'very,' cognate with Mehri *wīyən*, *baḥś-* 'alone,' cognate with Mehri *waḥś-*, the conjunction *bə-*, cognate with Mehri *wə-* (Rubin 2014: 34), and *buḥāt* pl. *būḥi* 'puddle' cognate with Arabic *wāḥah* 'oasis' (Western Shehret, Ahmad Hardan p.c.).

[10] Historical *w is reconstructed based on comparison with cognates in Mehri and the other MSAL.

[11] One anonymous reviewer suggests this could be due to spread of [+consonantal] in pre- and post-consonantal positions.

f   *ɛḳból* 'truces' (root */ḳ-w-l/)

A few words exist in which historical *y has the reflex /b/ in the right-hand leg of a consonant cluster, as in 9.:

9.a   *šəḳbéṭ* 'to spend the hot period' cp. *eḳyéṭ* 'to be during the hot period' (root /ḳ-y-ṭ/)

   b   *aʕbíd* 'to visit during the Eid festival,' *de-na-ʕbód-ən* [CONT_1PL_visit_during_Eid-

           IND] 'we are visiting during the Eid festival,' *a-ná-ʕbid* [FUT-1PL-visit_during_Eid.SUBJ] 'we

           visit during the Eid festival' cp. *ʕayd* 'Eid' (root */ʕ-y-d/)

   c   *ạġbéṭ* 'to anger' (Eastern, cp. Central *aġyéṭ*) (root /ġ-y-ṭ/)

4.3. /b/ as reflex of historical *b

/b/ functions as the reflex of historical *b in word-initial, pre- and post-consonantal and word-final position, as in:

- Word-initial

10.a   *béləġ* 'to reach puberty; to arrive/be able to arrive [at a place]'

   b   *berók* 'to kneel'

   c   *bɛhl-ét* [word-S] 'word'

- Pre-consonantal

11.a   *y-šábbəd* [3M-separate_from.IND] 'he separates from'

   b   *śɛbḥ* 'fat n.'

   c   *húbʕ-ət* [moving_a_lot-FS] 'moving a lot f.s.'

   d   *šəbṭ-ín* [have_big_belly-NOM] 'having a big belly'

   e   *yó-bləġ* [3MS-reach_maturity.SUBJ] 'he reaches maturity; he arrives/is able to

           arrive'

- Post-consonantal

12.a   *šeṣból-k* [cool_down-1/2MS.PERF] 'I/you m.s. cooled down'

   b   *ʕagb-ún* [love-NOM] 'lover'

   c   *məḳbɛ́r-ət* [cemetery-S] 'cemetery'

- Word-final

13.a   *ḥolób* 'to milk'

  b   *ʕágəb* 'to like'

  c   *ṣḥab* 'to drag'

Thus, /b/ functions both as the reflex of historical *b and of historical *w, occasionally of *y. /b/ rarely occurs as the reflex of historical *w in word-initial position (footnote 9), and word-final /b/ is always a reflex of historical *b. In the left- or right-hand leg of consonant clusters, the historical distinction between *w and *b is suspended (*yəbǵód* 'he goes' < */w-ǵ-d/, *yóbləǵ* 'he reaches maturity [subj]' < /b-l-ǵ/; *śɛbr* 'opinion' < */ś-w-r/, *śɛbḥ* 'fat n.' < /ś-b-ḥ/; *iḏbér* 'hornet' < */y-ḏ-b-r/, *ɛḳból* 'truces' < */ḳ-w-l/).

5. Word-medial realisation of /b m/ as [y]~[əy]

This section describes synchronic alternations of /b m/ with [y]~[əy]. In word-medial position, /b m/ may take the allophone [y]~[əy] between underlying /e/~/i/ (also, from our data, /ə/) and a stressed mid front or back vowel (Dufour 2016: 40, 41). As Dufour shows, depending on lexeme /ebé/, /emé/ /ebó/ and /emó/ can result in intervocalic elision or in realisation of [y]~[əy]. In the case of /ibé/, /ibó/, /imó/, /ebɛ́/ and /emɛ́/, the realisation from the data currently available appears to be always [y]~[əy].[12] In the examples given below, significant dialect differences are noted. Where attested, this section compares inflections in which /b m/ are realised as [y]~[əy] with inflections from the same lexeme or root in which /b m/ take the canonical allophones [b m].

5.1. Nominals

Root-final /b/ (14.a–d), impressionistically less commonly root-final /m/ (14.e–f), take the allophone [y] before certain stressed nominal suffixes. /b m/ in 14. fall between underlying /i/~/e/ and a stressed mid vowel, with /n/ in 14.a raising stressed /e/ to [i].

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[12] Jarred Brewster (p.c.) makes the interesting suggestion, which he is currently exploring, that [y]~[əy] functions to repair hiatus in certain cases of intervocalic elision of /b m/.

14.a   *ḥīly-ín* [milking-VN] 'milking'[13] (Eastern, cp. Central Western *ḥalōt*) cp. *yə-ḥélb*

[3MS-milk.IND] 'he milks'

b   *ʕənš̃y-ét* [spider-S] 'spider' cp. *ʕonókub* 'spiders' (root /ʕ-n-k-b/)

c   *dīryót* 'Darbat [place name]' (root /d-r-b/)

d   *ṣīry-ót* [post-monsoon.ADJ-FS] 'pertaining to the post-monsoon period' cp. *ṣerb*

'post-monsoon period'

e   *t̠īly-ū́t* [darkness-S] 'darkness' (root /t̠-l-m/)

f   *xũy-ḗ̃t* [tent-S] 'tent' cp. *xẽm* 'tents'

Root-medial /b/, and impressionistically less commonly root-medial /m/, are realised as [y]~[əy] in the onset to a final stressed syllable in certain non-derived nominal forms. Examples in 15. all share the underlying template Ceb/mɛC, with root-final gutturals /ġ ḥ x/ causing vowel lowering to [ɑ]~[ā] in 15.b–d:

15.a   *gəyél* 'mountains' cp. *gəbl-í* [mountain_man-ADJ] 'mountain man'

b   *səyáx-t* [manure-S] 'manure' cp. *məsbáx-t* 'manure heap' [manure_heap-S]

c   *ṣəyā́ġ* 'dyes' cp. *ṣəbġ-át* [dye- S] 'dye'

d   *śəyā́h* 'handsome m.pl.' cp. *śəbh-át* [handsome-S] 'handsome s.'

e   *səyɛ́b* 'reason' cp. *esbéb* 'to cause'[14]

f   *ṭəyél* 'silver containers for bride's possessions' cp. *ṭəbl-ɛ́t* [silver_container-S]

'silver container for bride's possessions'

g   *rəyɛ̃́ḥ* 'arrows' cp. *rəmḥ-át* [arrow-S] 'arrow'

h   *kəyɛ̃́t~kəyɛ̃́* 'women's headcloth' (root /k-m-m/) (cf. Johnstone 1981: 131)[15]

5.2. Verbs

In certain verbs, root-final /b/ and /m/ take the allophone [y]~[əy] before the stressed 3fs vowel-initial perfect verb subject suffix *-ót*, nasalised and raised to *-ū́t* due to nasal effect in the case of root-final /m/ (Dufour 2016: 39–40), as in 16.a–d /b/ > [y]; 16.e–i /m/ > [y].

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[13] Adjacent nasals cause /e/ to raise to [i] and /o/ to raise to [u]. Syllable restructuring under the effect of a sonorant causes the initial vowel to lengthen in examples (a) and (c–e) and in relevant examples in 16. (Dufour 2016: 39).

[14] Cp. *d̠beb* 'flies' (Johnstone 1981: 45).

[15] Our *y* given in Johnstone and Rubin as *i*, but in Dufour (2016) as *y*.

16.a   *ḳēry-ót* [approach-3FS.PERF] 'she approached' cp. *ḳérəb~ḳerb* 'to approach'

b   *ʕagy-ót* [like-3FS.PERF] 'she likes' cp. *ʕágəb* 'to like' (Central mountains, cp. Eastern *ʕajót*, Central Western *ʕagót*)

c   *sīly-ót* [wait-3FS.PERF] 'she waited' cp. *sīləb~selb* 'to wait'

d   *ṣḥey-ót* [drag-3FS.PERF] 'she dragged' cp. *ṣḥab* 'to drag'

e   *ḥīly-ót* [dream-3FS.PERF] 'she dreamt' cp. *ḥelm* 'to dream'

f   *ṭəhy-ū́t* [disappear-3FS.PERF] 'she disappeared' cp. *ṭəhέm* 'to disappear'

g   *śəy-ū́t* [sell-3FS.PERF] 'she sold' cp. *śēm* 'to sell' (Eastern, cp. Central Eastern, Central and Central Western *śũ̄t*)

h   *śtəy-ū́t* [buy-3FS.PERF] 'she bought' cp. *śotέm* 'to buy' (Eastern, cp. Central Eastern, Central and Central Western *śtũ̄t*)

i   *zaḥy-ū́t* [come-3FS.PERF] 'she came' (also *zaḥū̃́t* in the same dialects, cp. 1.d)

Root-medial /b/ and, impressionistically less commonly /m/, take the allophone [y] in the onset to a final stressed syllable in the indicative, occasionally subjunctive (17.b), of triliteral and quadriliteral verbs. In these cases, /b m/ fall between underlying /i/~/e/ and a stressed mid vowel, with /o/ nasalised and raised by /m/ to [ū] (17.f–g) and /e/ nasalised and raised to [ī] (17.h). Examples include:

17.a   *yə-ṭyóḳ* [3M-be_given_liability.IND] 'he is given a liability' cp. *yəṭbóḳ* 'he is given a liability [subj]'

b   *ha-yə-ṭyél* [FUT-3M-take_long_time.SUBJ] 'he will take a long time' cp. *eṭbél* 'to take a long time'

c   *d-i-šeśyél* [CONT-3M-cool_down.IND] 'he cools down' cp. *šeṣbél* 'to cool down'

d   *d-i-kēryól* [CONT-3M-crawl.IND] 'he is crawling' cp. *ekérbel* 'to crawl'

e   *d-i-ṭēryól* [CONT-3M-cover_with_tarpaulin.IND] 'he is covering with tarpaulin' cp. *ṭárbəl* 'tarpaulin'

f   *yə-ṭyū́r* [3M-ripen.IND] 'it m. ripens' cp. *yəṭmúr* 'it ripens [subj]'

g   *yə-xyū́s* [3M-rot.IND] 'it m. rots' (root /x-m-s/)

h   *yə-gyī́d* [3M-freeze.PL.IND] 'they m. freeze' (root /g-m-d/)

The allophonic lenition of /b/ to [y] creates (near-)minimal pairs in some dialects: *ʕaṣbét* 'solidarity' contrasts with *ʕaṣyét* 'hard work; graft,' both from the consonantal root /ʕ-ṣ-b/; in the dialect of the

second author, spoken in Eastern Dhofar Jufa and Sadḥ, *ʕḗjyót* 'she loves' contrasts with *ʕajót* 'she likes,' both from the root /ʕ-j-b/.

Thus, *y* functions as the reflex of historical *b, as a phoneme in its own right, and as a lenited allophone of synchronic /b/ and /m/.

Table 2. sums up the diachronic and synchronic reflexes of *b, *m, *w, *y. # denotes word boundary, C denotes consonant, V denotes 'vowel,' and ~ denotes lexical variation.

	VCV[16]	#_	_#	_C	C_
*b	elision~y	b	b	b	b
*m	elision~y	m	m	m	m
*w	elision	elision	V~elision	b	b
*y	elision	y~elision	y~V~elision	y	y~b

Table 2. Reflexes of *b, *m, *w, *y

6. A phonetic rationale for the patterning of /b/ with /m y/ *w

In Section 3., we have seen that /b/ patterns with /m y/ in being subject to elision between phonological vowels and in Section 4. that /b/ patterns with /m/ in taking the allophone [y]~[əy] between an underlying /e/~/i/ and a stressed mid front or back vowel on a lexeme-by-lexeme basis. Here we consider the phonetic lenition of /b/ in word-medial position.

/b/ as a reflex of both *w and *b is frequently lenited to a voiced bilabial fricative or sonorant in word-medial position, and we believe that the glide allophone [y] of /b/ and the patterning of /b/ with /m y/ *w may be motivated by the tendency of word-medial /b/ to lenite at the phonetic level. Word-medial lenition in cases such as these is described in the literature as 'sonorisation' (Szigetvári 2008) or 'continuity lenition' (Katz 2016; Katz and Pitzanti 2019). Here we adopt the term 'continuity lenition.' Continuity lenition results in the stop increasing in intensity, thus becoming more vowel-like and minimising 'the auditory disruption [it creates] in the context of high-intensity sounds' (Katz 2016: 43). Coronal and velar plosives are also subject to continuity lenition in Shehret, as they are in Mehri (Watson *et al.* in prep.); however, impressionistically /b/ in Shehret is more consistently subject to

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[16] Within the prosodic word, allowing for variable maintenance or elision in case of nouns examined in Section 3. Variation with [y]~[əy] depends at least partially on dialect and on the quality of the vocalic environment, as noted above.

lenition, and is typically subject to greater lenition, than either the coronal or the velar plosives. This is of interest cross-linguistically, as the Romance languages, for example, show a trend for lenition to apply most frequently to velars[17] and least frequently to labials (Hualde, Nadeu and Simonet 2010; MacLeod 2020; cf. Recasens 2015[18]).[19] The predilection for lenition of /b/ in Shehret, however, may be due to inventory constraints (Ortega-Lebaria 2003): while lenited /g/ could be confused with the 'unbreathed' uvular fricative /ġ/ and lenited /d/ with the 'unbreathed' (voiced) interdental fricative /ḏ/, /b/ in Central and Eastern Shehret has no synchronic labial sonorant or bilateral fricative with which it could be confused. Impressionistically, /b/ lenition appears to depend on the quality of the following vowel, with lenition more common before central and mid front vowels (/ə e ɛ/) than before low and back vowels (/a o ɔ̄/), as found in literature on lenition in Spanish and English (Ortega-Lebaria 2003).

Phonetic lenition of Shehret /b/ is optional, and where it occurs produces a cline, from frication to complete sonorisation. As in the case of voiced plosive lenition in Spanish (e.g. Soler and Romero 1999; Martínez-Celdrán, Fernández-Planas and Carrera-Sabaté 2003; Katz 2016), /b/ lenition typically does not occur following a nasal, as in Shehret *səmbiḳ* (< /sənbiḳ/) 'boat.'[20] Lenition in Shehret commonly occurs where /b/ falls in the onset to an unstressed syllable, as is typically found cross-linguistically (Gordon 2011), particularly where it is separated from a following consonant by an essentially non-phonological intrusive vowel resulting from infelicitous consonant contact (Hall 2006), or where it falls in the coda to a word-medial consonant cluster; however, /b/ lenition also occurs in the onset to stressed syllables. While speakers are aware of the glide allophone of /b/ and /m/ in post-consonantal position, such that *y* is given by literate speakers in written representations of Shehret words, phonetic lenition of /b/ resulting in frication or sonorisation is beyond the level of speaker awareness. When literate speakers were asked during fieldwork which consonants were involved in the words, they say, for example, /z/, /r/, /b/ and /g/ for *zɛrbég* '[place name]' and /k/, /s/, /b/ and

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[17] The cross-linguistic tendency for closure duration to decrease as the place of articulation decreases in anteriority leads to the greater probability for velar plosives to lenite than alveolar followed by labial (Ham 2001).

[18] Recasens (2015: 18) shows for Catalan that while /g/ is most commonly lenited, /b/ did not show more resistance to lenition than /d/.

[19] However, Kirchner's survey of lenition in 272 languages appears to falsify the hypothesis of a place-of-articulation asymmetry (Kirchner 1998: 6): for example, Lomongo (data cited from Hulstaert 1961) and Tamazight Berber (data cited from Abdel-Massih 1971) both lenite /b/ to the exclusion of coronal and velar stops.

[20] However, some tokens of post-nasal plain 'unbreathed' plosive lenition are attested among our speakers, even in wordlist data, as in *ndəxét* [nðəxet] 'incense,' and *sənbíḳ* [səmβiḳ] 'boat.'

/t/ for *ksbɛ́t* 'clothes,' even where /b/ is lenited to a sonorant.[21] This may be at least partly due to the lenited variant maintaining its bilabial feature and to the fact that lenition occurs at a low phonetic level.

6.1. The role of speech rate and lenition

The degree of plosive continuity lenition is anticipated to depend on speech rate, being more likely to occur in fast, casual speech than in careful speech (e.g. Kirchner 1998, 2001, 2004; Warner 2011; Melero-Garcia 2021). For this paper, we examine wordlist data produced at a careful speech rate. We assume that the rate of continuity lenition will increase in narrative speech and in fast-speech data; this has been found to be the case comparing word-list data with narrative data in the sister language, Mehri (Watson *et al.,* in prep.). Acoustic data were elicited by providing speakers with wordlists using the Arabic-based orthography developed during the DEAMSA project and asking them to pronounce each word clearly three to five times at normal speed. The speakers were unaware of the purpose of the exercise at the time of recording. The data presented from J028, a male aged 35, and J019, a male aged 62, both from Jufa and the tribe of Bayt al-Kathir, were recorded during the Covid-19 pandemic on the Voice Memos app in iPhone by the second author, then converted to WAV files by Chris Norton prior to segmentation and analysis through Praat (Boersma and Weenick 2017). Data from J001 and J116a were collected in the University of Leeds phonetic laboratory in April 2019 and saved in WAV format 44 kHz, 16 bit; J001 is a 38-year-old male from Gabgabt and the tribe of Bayt ʕĀmir Gīd, and J116a is a 32-year-old female from Tāqah and the tribe of Bayt al-Maʕšani. J019, J028 and J116a were brought up speaking Shehret at home and learnt Arabic at school. J001 was brought up as a balanced bilingual in Mehri and Shehret and learnt Arabic at school.[22] In the drawings of Praat textgrids provided in this paper, tier 3 is used to note lenition (L /b/ = lenited /b/, PL /b/ = partly lenited /b/), pre-voicing (PV), intrusive vowel (IV) and plosive burst (B); tier 4 notes stress: secondary stress (uf), primary stress (sf). For analysis, the spectrogram view range was set at 0-10,000 Hz and the dynamic range at 50dB. In this section, we begin by looking at acoustic features of non-lenited /b/ before examining tokens of lenited and partly lenited /b/.

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[21] Although /w/ is not part of the synchronic phonology of Central and Eastern Shehret, it does occur in Arabic loanwords and in words adopted from Mehri, so speakers are aware of the distinction between a bilabial obstruent and a labio-velar sonorant.

[22] Additional speakers recorded in the field using a Laryngograph EGG-D200 with an ECM 500L lapel microphone exhibited similar lenition patterns. Their data will be analysed in future work.

6.1.1. Non-lenited /b/

Non-lenited /b/ has clear voicing throughout as evidenced by the voice bar, a significant drop in amplitude compared to adjacent sonorants, lack of clear formant structure, and a distinctive burst. An example of non-lenited word-medial /b/ is given in Figure 1. *səmbiḳ* 'boat,' produced by J001. An example of non-lenited word-initial /b/ is given in Figure 2. *bek* 'with you m.s.,' produced by J116a.
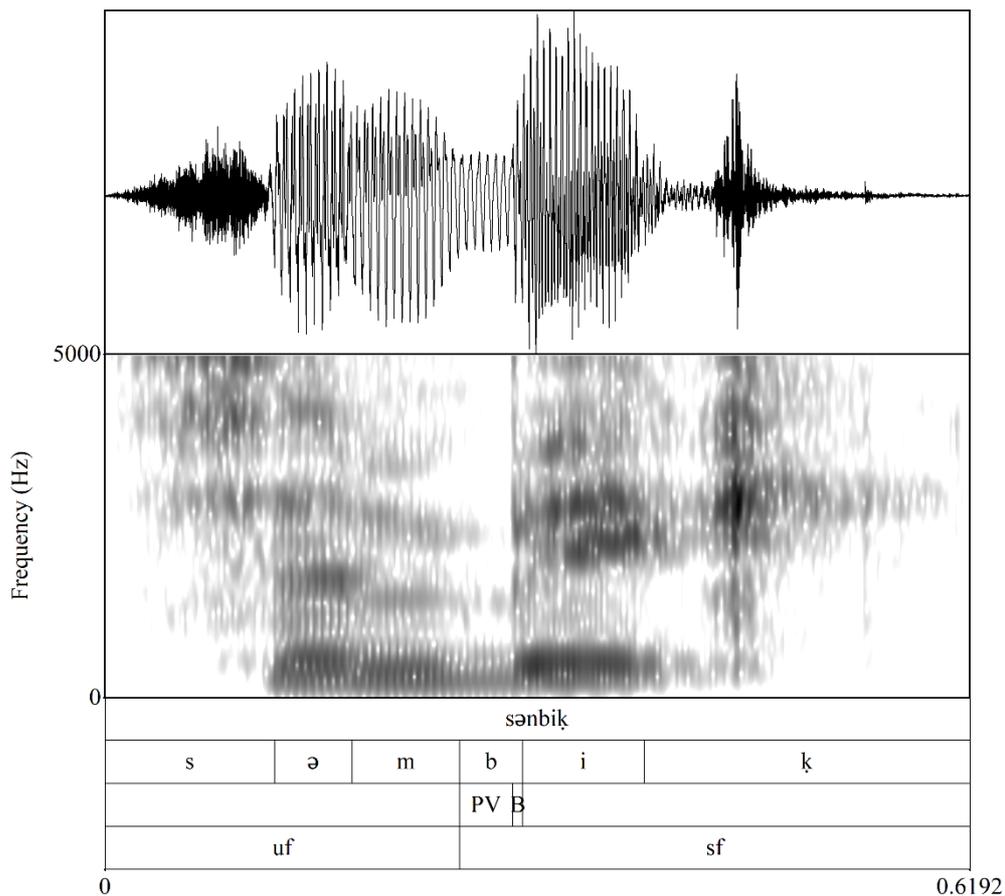
Figure 1. J001: *sənbíḳ* 'boat'
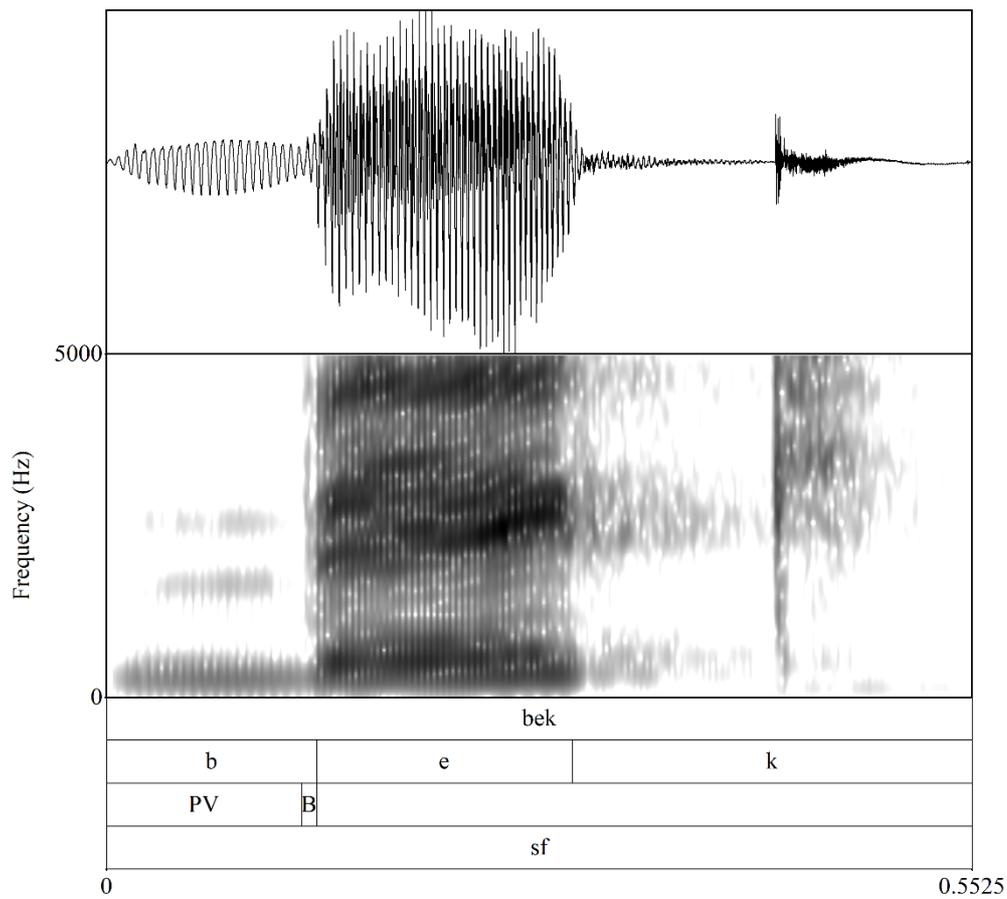
Figure 2. J116a: *bek* 'with you m.s.'

6.1.2. Lenited and partly lenited /b/

Lenited /b/ was identified by the two authors auditorily and acoustically. Auditorily, lenited /b/ was identified by listening with headphones from the latter part of the preceding vowel to the midpoint of the following vowel to determine whether a plosive, fricative or sonorant was perceived. Acoustically, lenited /b/ displays a lower drop in amplitude than non-lenited /b/, clear formant structure throughout the articulation, and lack of a clear burst, as seen for *zábǵət* 'euphoria' in Figure 3. produced by J028 and *ṭablét* 'silver box' in Figure 4. produced by J116a.
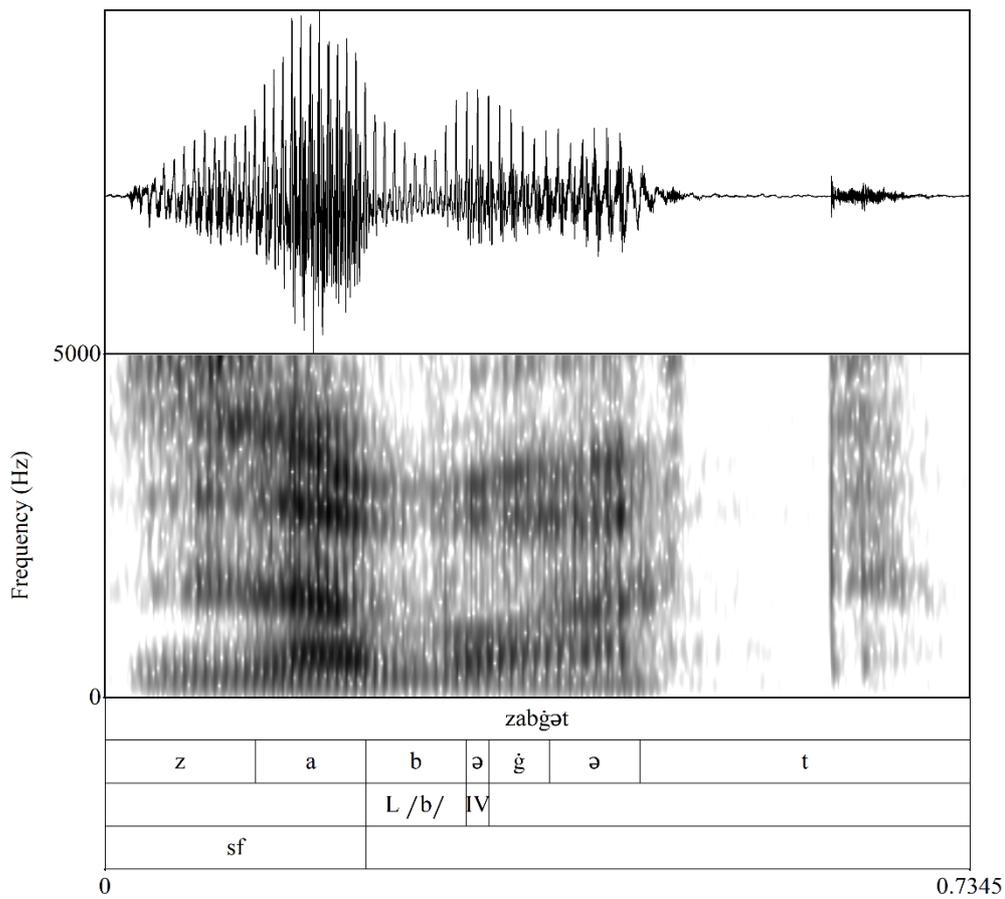
Figure 3. J028: *zábġət* 'euphoria'
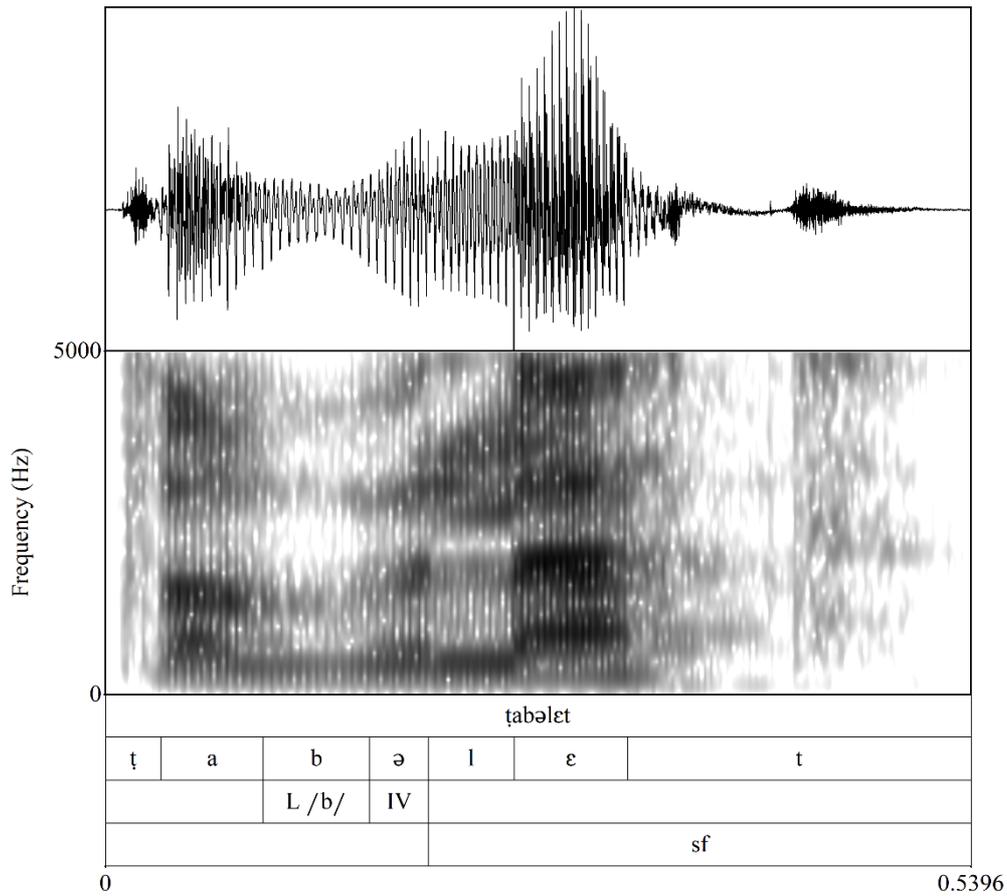
Figure 4. J116a: *ṭablɛ́t* 'silver box'

Partial lenition shows a drop in amplitude and lacks clear formant structure, as for non-lenited /b/, but is distinguished from the latter by the lack of a clear burst, as exemplified by *zábǵət* 'euphoria' in Figure 5., produced by J019:
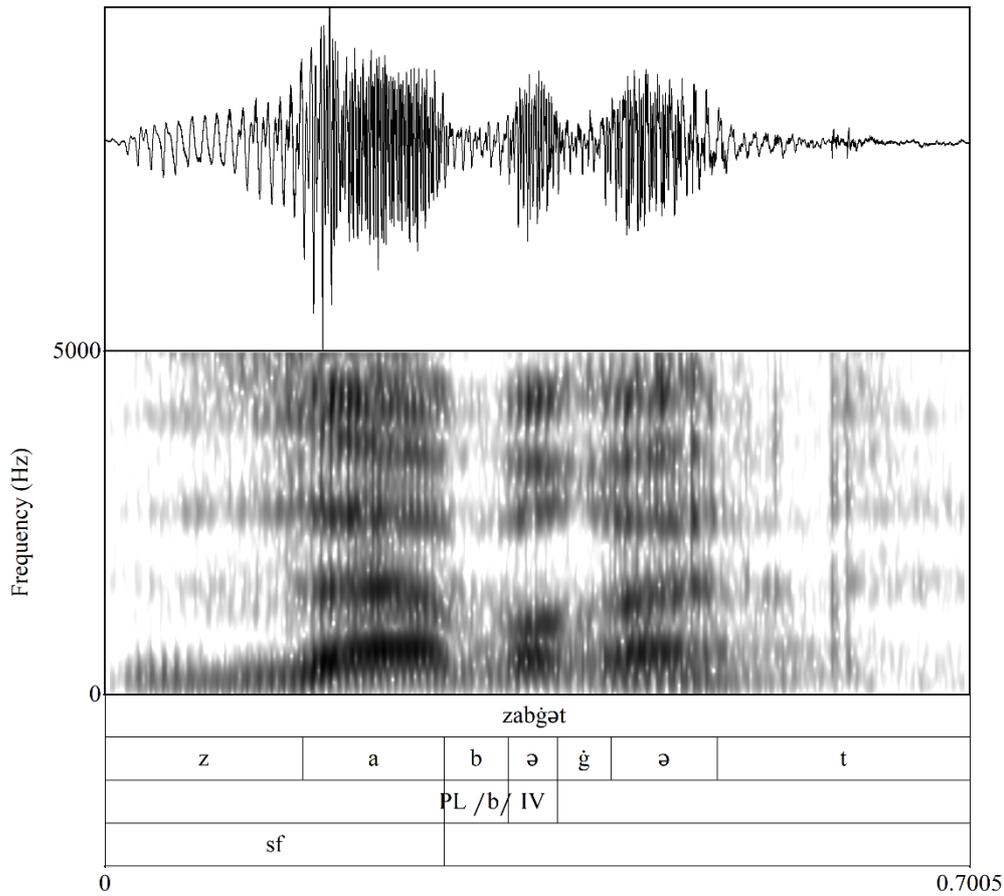
Figure 5. J019: *zábġət* 'euphoria'

6.2. The role of stress

In terms of stress position, lenition is predicted to occur more frequently in the onset to an unstressed syllable than to a stressed syllable (Gordon 2011). Figure 5. of *zábġət* and Figure 6. of *šəbzím* 'to ask s.o. to lend you s.th. for a while' produced by J019, show lenited /b/ in the onset to unstressed syllables headed by intrusive vowels (IV).
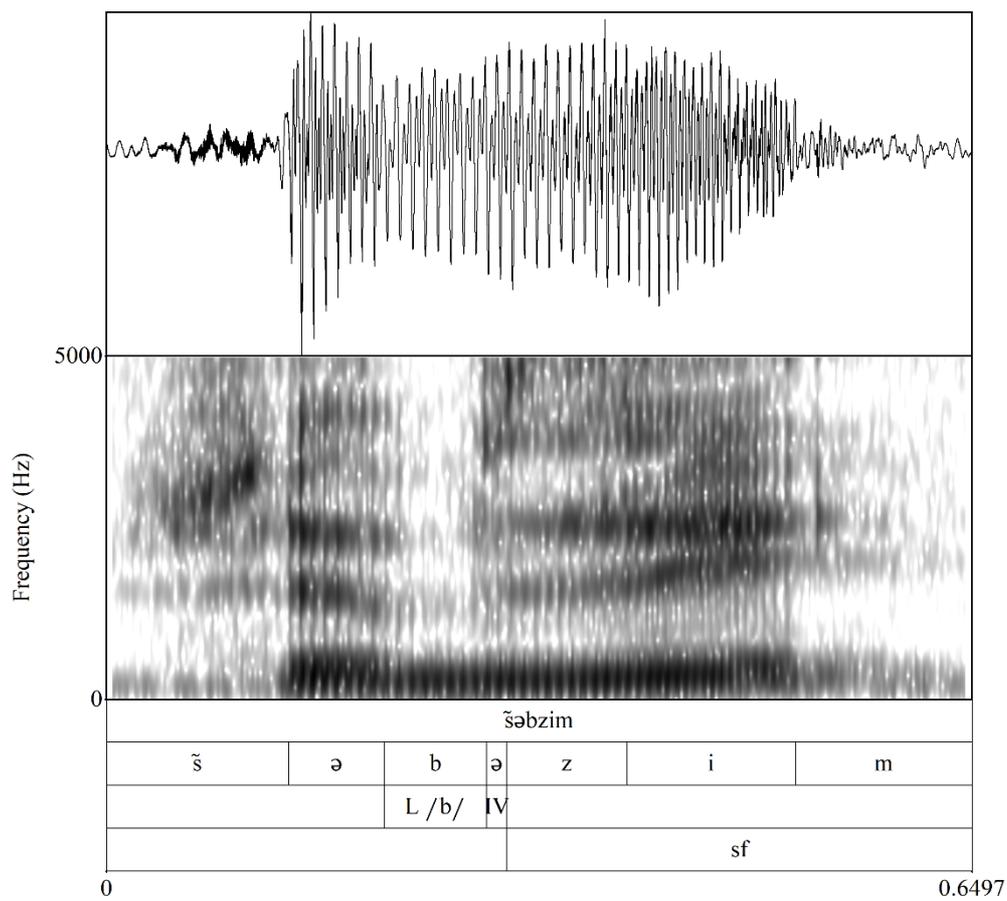
Figure 6. J019: *s̃əbzím* 'to ask s.o. to lend s.th. for a while'

However, tokens of /b/ lenition are frequently attested by all our speakers in the onset to a stressed syllable, as we see in Figures 7., 8. and 9. of *zɛrbég* '[place name],' *ksbέt* 'clothes' and *ĩk̲bέrət* 'the graveyard.' Of these, /b/ in Figure 9. most clearly exhibits the short duration, high amplitude and formant structure of a typical glide:
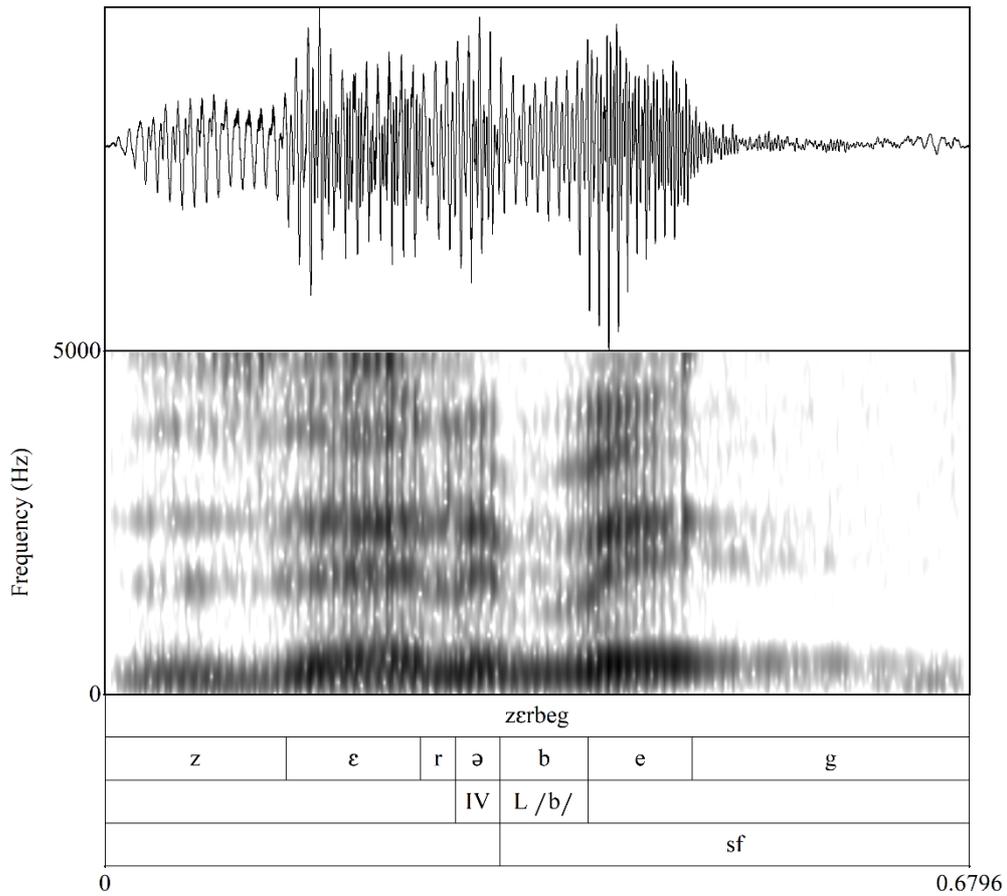
Figure 7. J019: *zɛrbég* '[place name]'
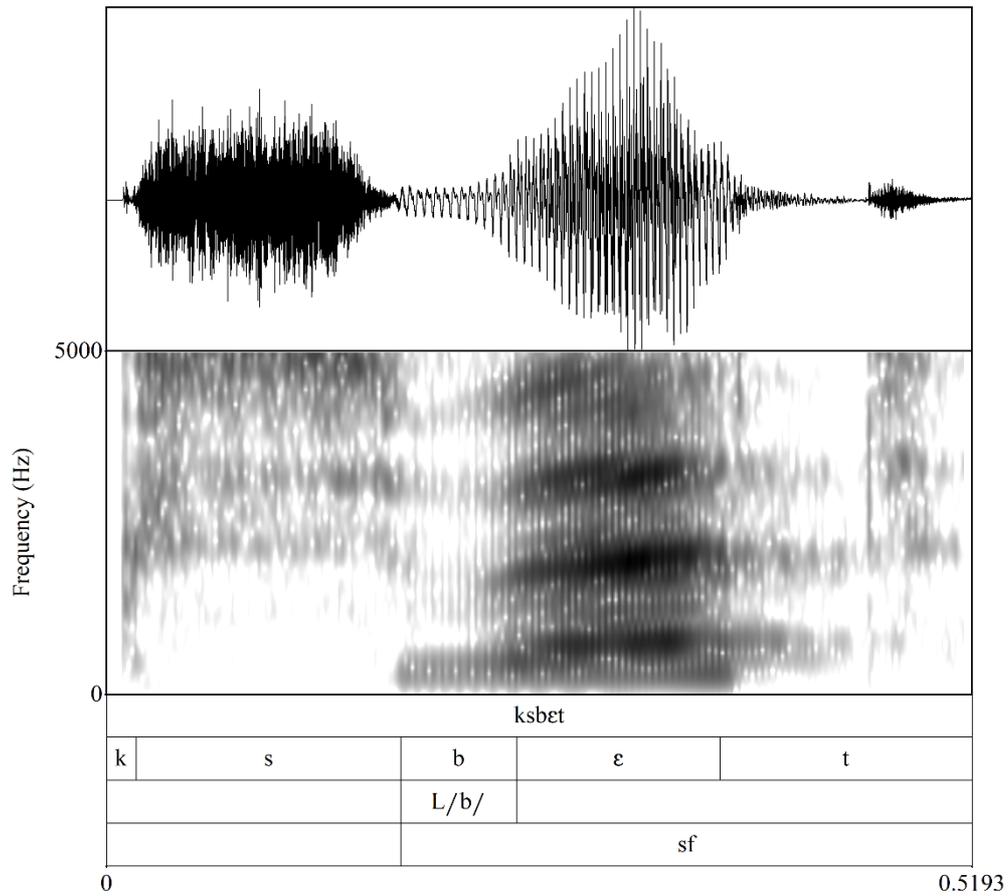
Figure 8. J116a: *ksbɛ́t* 'clothes'
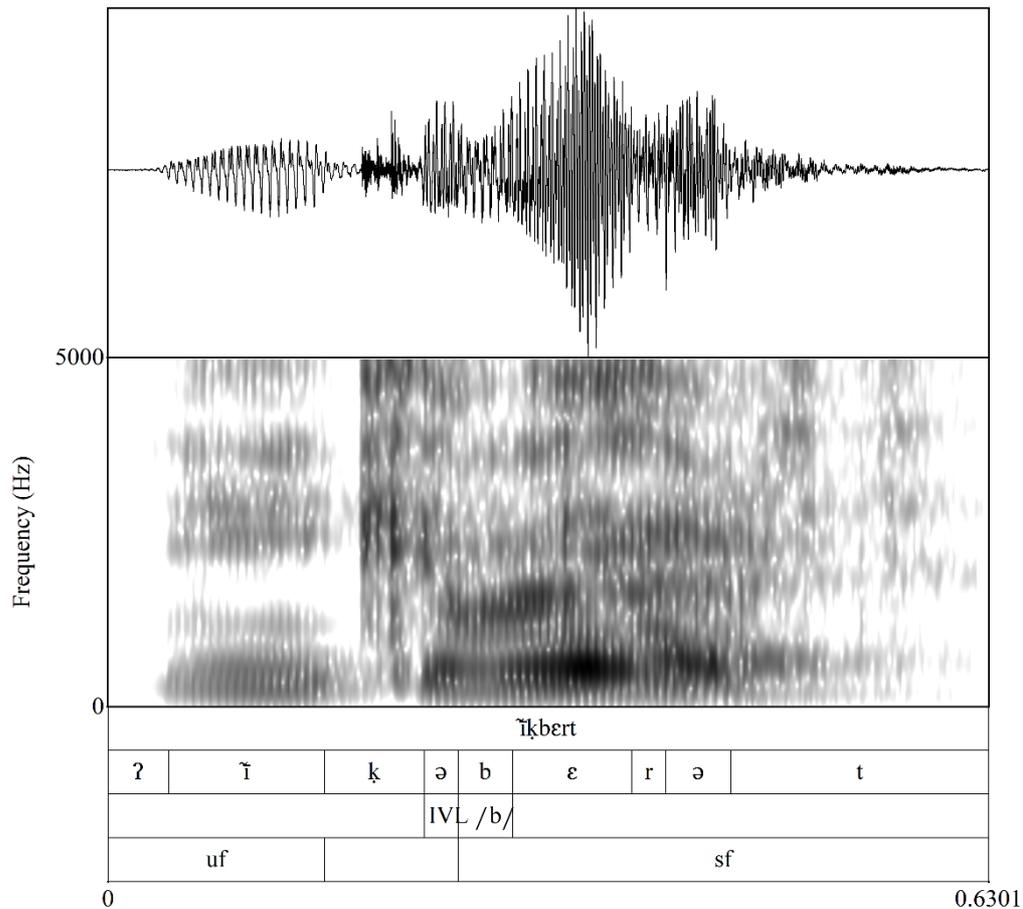
Figure 9. J001: ĩk̲bέrət 'the graveyard'

6.3. The role of vowel context

Vowel context is shown to have an effect in continuity lenition in other languages (e.g. Otero-Lebaria 2003 for Spanish and English). Impressionistically, /b/ lenition in Shehret occurs more frequently before central and mid front vowels (ə, e, ɛ, ɛ̄) than before low and back vowels (a, o, ɔ̄, u); however, /b/ lenition before stressed /a/ is also attested, such that all tokens of *aṣbáḥan* 'we were in the morning' produced by J001 are realised with a fully lenited /b/, as in Figure 10.:
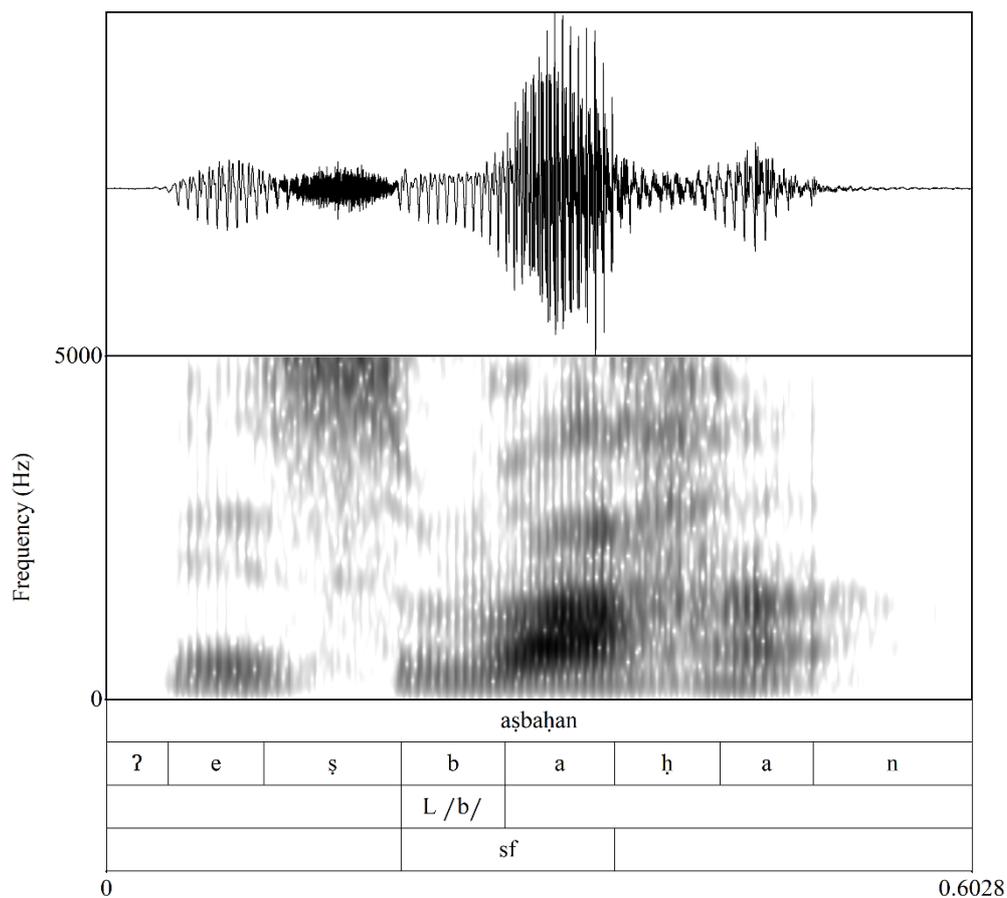
Figure 10. J001: *aṣbáḥan* 'we were in the morning'

Although certain speakers have a tendency to lenite /b/ more frequently than others, continuity lenition of /b/ does not appear to depend on the speaker's tribe, region, age or sex. Tokens of continuity lenition of /b/ have been found in these and other data from speakers from the tribes of Bit al-Kathir, the second author's tribe, Bit ʕĀmir Gīd, Bit al-Maʕšani, Bit Ḥardān and Bit al-Mašīkhi, from speakers from the Central, Central Western and Eastern regions of Dhofar, and from male and female speakers of different ages and educational levels.

7. The patterning of /b m y/ and *w

The phonological patterning of /b m y/ and *w cannot be attributed to a set of shared phonological features; however, phonetically "unnatural" classes such as this are far from uncommon across the languages of the world (Mielke 2008); within Mielke's (2008) Emergent Feature Theory, such classes can be accounted for by the pressures of phonetics, phonotactics and "external" factors. Blevins (2004) analyses the evolution of sound patterns on the basis of CHANGE, CHANCE and CHOICE. The creation

of the phonetically unnatural class of intervocalic elided consonants in Shehret appears to have arisen both through the tendency of word-medial /b/ to lenite post-lexically, thus becoming more intense and sonorant-like, and through a series of generalisations involving phonetic similarity at each stage (cf. Culicover 1970, cited in Mielke 2009, for a series of generalisations that produces the vowel class /æ a e ɔ o/ in Dmitriev, a dialect of Russian). In Emergent Feature Theory (Mielke 2008), phonologically active classes can result from generalisations to groups of phonetically similar segments, with both phonetics and "external" factors involved in the development of phonetically natural and unnatural classes. For the Dmitriev vowel class, the phonetic similarity metric developed by Mielke (2005) based on an objective model of phonetic similarity was demonstrated to simulate each following stage in creating the class, with the learner generalising stage by stage to phonetically similar segments from /æ/ to /æ a/, /æ a/ to /æ a ɔ/ and /e æ a/, /e æ a/ to /e æ a ɔ/, and /e æ a ɔ/ to /e æ a ɔ o/ (Mielke 2009: 34). Culicover's (1970) vowel set generalisation is given as a series of five changes:

$$
\begin{array}{ccccc}
 & 1 & & 2 & \\
\text{æ} & \rightarrow & \text{a} & \rightarrow & \text{e} \\
 & & 5 \downarrow & & 3 \downarrow \\
 & & \text{ɔ} & & \text{ɔ} \\
 & & & & 4 \downarrow \\
 & & & & \text{o}
\end{array}
$$
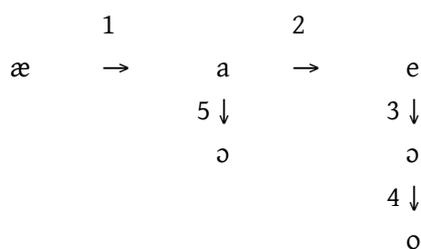
Figure 11. Dmitriev vowel set generalisation

Taking each stage as a starting point, Mielke's simulation model generalised to /e æ a ɔ o/ in four out of five cases. The simulation model models the fact that natural classes based on chains of phonetic similarity are common, generalising to phonetically similar segments without the need to resort to innate phonological features or rule out attested patterns.

Although Mielke's phonetic similarity metric does not involve innate phonological features, we refer to features in the diagram below for convenience to illustrate degrees of phonetic similarity. Each stage is represented by an arrow. For Shehret, we assume that the learner generalises from /y/ ([+high][+sonorant]) to *w (adding [+labial]) to /m/ (deleting [+high]) to /b/ (deleting [+sonorant]):

y   [+high] [+sonorant]   →   *w [+high] [+sonorant] [+labial]
                                                    ↓
                                                    m [+sonorant] [+labial]
                                                    ↓
                                                    b [+labial]
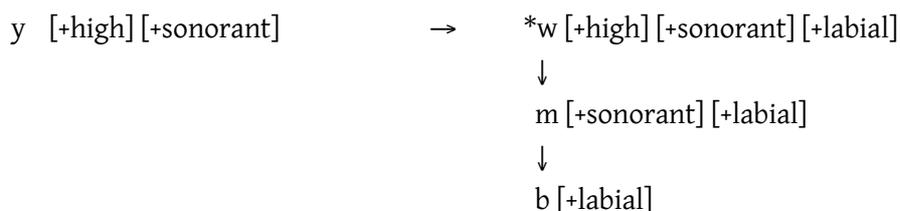
Figure 12. Shehret y > *w > m > b generalisation

In this scenario, the speaker generalises from /y/, arguably the weakest, least marked segment in the set to /y/ *w, to /y *w m/, and to /y *w m b/. Hence, while /y/ and /b/ share no phonological features to the exclusion of all other segments, phonetic similarity is exhibited along the chain, with /m b/ sharing [+labial] and, in this model, distinguished by [+sonorant].

8. Conclusion

In this paper, we have provided a discussion of the class /b m y/ *w in Shehret, with focus on the phonetic and phonological behaviour of *b.* While the set of consonants subject to intervocalic deletion include /b m y/, *b* is distinguished by functioning as the reflex of both *w and *b, occasionally *y, as patterning with /m/ in alternating with [y]~[əy] between underlying /e/~/i/ and a stressed mid front or back vowel in certain lexemes, and, in the case of historical *b, in having the reflex /y/ in a closed set of words. /b/ is also subject to phonetic, variable continuity lenition in word-medial position, both in fast, casual speech and in careful speech, and both in the onset to unstressed syllables and in the onset to stressed syllables. The set of consonants that undergo intervocalic deletion is an "unnatural" phonetic class in the sense of Mielke (2008), in that it does not include all the sonorants (excluding /l n r/), does not include all labials (excluding /f/, including /y/), and contains two consonants that share no feature to the exclusion of phonemes outside this class in the language (/y/ and /b/). We suggest that the inclusion of /b/ in this class is due to inventory constraints by which lenited /b/ conflicts with no synchronic phoneme, due to the resultant predilection of /b/ to lenite towards a sonorant word-medially, and due to pressures of phonetic similarity leading to expansion of the phonological class on a stage-by-stage basis. Thus, /b/ behaves in certain environments as an obstruent and in others as a sonorant. The discussion of /b/ continuity lenition in this paper examined wordlist data from four speakers; we assume that speech rate has an effect on lenition, such that faster rate speech and narrative data will exhibit greater lenition than carefully produced wordlist data. Future work will examine the cline of word-medial /b/ continuity lenition through the analysis of narrative data and wordlist data from further speakers. It will consider the role of the vocalic context to test the

hypothesis that continuity lenition is more frequently encountered when followed by a front central or mid vowel. It will also include statistical work on lenition of plain 'unbreathed' (voiced) alveolar and velar stops to test our hypothesis that /b/ lenition is more frequent and greater than lenition of either /d/ or /g/.

Abbreviations

1	first person		m.s.	masculine singular (in glosses)
2	second person		NOM	nominaliser
3	third person		PERF	perfect
ADJ	adjectival		PERF	perfect
B	plosive burst		PL	plural
CONT	continuous/habitual		PL /b/	partly lenited /b/
DEAMSA	Documentation and Ethnolinguistic		PV	pre-voicing
	Analysis of Modern South Arabian		S	singular
DEF	definite		SF	primary stress
DU	dual		s.o.	someone
F	feminine		s.th.	something
FUT	future		SUBJ	subjunctive
IND	indicative		uf	secondary stress
IV	intrusive vowel		VN	verbal noun
L /b/	lenited /b/		VOC	vocative
M	masculine			

References

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