The lexicon has its grammar, which the grammar knows nothing of
Marginal contrast and phonological theory

Patrik Bye
University of Tromsø

Abstract

Marginal phonemes exploit systemically latent possibilities of contrast but have unusual lexical distributions characterized by clustering according to expressive function or morphological structure. This paper discusses examples of marginal contrast from several languages and shows that, despite initial appearances, it is not possible to confine marginally contrasting items to well-defined strata, lexical or morphological. Marginal phonemes are structure preserving, and turn up, however infrequently, in core and non-derived environments. Explanations for clustering must accordingly be sought outside grammatical theory.

1. Marginal contrast

Many natural human languages afford examples of marginal contrasts. A recent grammar of the Brazilian language Hup (Epps 2008: 46, 63), for example, states that the glottalized /p'/ only occurs in a single morpheme, the noun meaning 'priest' /p'ăy/. Similarly, the Abkhaz word /a-ˈf'a/ 'thin' is the only one in the language to have the /f'/ phoneme (Hewitt 1979: 257).[1]

Marginal contrasts are interesting to linguistic theory because they may appear to challenge the Cartesian assumptions of clear-cut categories and systems. And yet, precisely from the vantage point of the system, marginal phonemes may be seen to be exploiting latent possibilities of contrast — they are in this sense 'structure preserving'. Kiparsky (1995) argues for a 'priming effect' as a diachronic analogue of structure preservation, according to which "redundant features are likely to be phonologized if the language's phonological representations have a class node to host them." To take an example from the history of English, the phonemicization of /ʒ/ which, in initial position, is restricted to low frequency French loanwords such as *gitane* and *gîte*, was primed through the prior existence of a postalveolar sibilant /ʃ/ and a voiced fricative series /v ð z/. The novel phoneme /ʒ/ represents the intersection between the voiced fricative and postalveolar series. Put differently, we might say that /ʒ/ was a grammatical combination of features before any words containing it actually populated the English lexicon. This structure-preserving quality would also appear to hold for the marginal phonemes in Abkhaz and Hup. Abkhaz has plain stops, fricatives, and ejective stops. The possibility of ejective stops entails, on a minimal interpretation, that the combination [–sonorant, contricted glottis] is licit, although it implicitly also allows ejective fricatives. The case of marginal /p'/ in Hup is more subtle. The language has contrasting series of voiceless and voiced plain stops /p t c k/ • /b d ɟ g/, but in the glottalized series the voicing contrast is largely neutralized, with the exception of /p'/. In initial position, the glottalized dorsal stops are voiceless /c' k'/ (which Epps transcribes as /j' g'/) but the labial and alveolar /b' d'/ are voiced.[2] There are well-known aerodynamic constraints against voicing in dorsal consonants, but the prior existence of a voiceless and voiced plain stop series and the distribution of the glottalized series between voiceless and voiced would seem to create a space for marginal /p'/.

[1] Hewitt states that it is only found in some speakers. The word is pronounced /a-ˈp'a/ by the majority.

[2] Epps describes the main correlate of phonological glottalization as laryngealization or creakiness of a following vowel, although the dorsals /c' k'/ may be 'mildly ejective'. In final position, they are unreleased, effectively neutralizing them with plain voiceless stops.

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In a recent paper addressing itself to marginal contrasts in languages, Scobbie and Stuart-Smith (2008: 15) write:

> These problematic segments are characterized by such factors as low functional load, limited phonotactic distribution, contrast in only a limited phonotactic or grammatical environment, few or no examples of real minimal pairs, speaker intuitions that are variable or at odds with the distributional facts, late acquisition, unpredictable lexical incidence, lexical stratification (so that contrasts may only be found in names, loan words, sub-lexicons, etc.) interference from literacy, patterns of variation and change, complex phonetic correlates, abstract cross-positional (e.g. onset to coda) relationships, ambiguity over whether they are singletons or clusters, and low participation in phonological processes.

They add that "phonology should reflect more closely the patterns in the data, or be clearer about how it has abstracted away from them." The perspective taken in this paper is that the grammar defines a space of possible contrast, but has nothing to say about the way this space is actually populated by lexical items. Attempts to make grammar reflect the texture of lexical reality more closely lead to lack of restrictiveness in theory and end up obscuring the phenomena they seek to capture by forcing fuzzier lexical states of affairs onto a systemic Procrustean bed. In this paper, we will examine four cases of marginal contrast. Section 2 examines a marginal contrast in RP, arguing that high token frequency is the only thing that unifies the lexical items that display it. Section 3 examines a marginal segment in North Saami whose lexical distribution correlates strongly with a particular semantics. Section 4 looks at a marginal contrast that correlates with derived morphology in Afrikaans, and Section 5 examines a case in Javanese, where there seems to be a correlation with both morphological structure and semantics. The conclusion is that despite superficial appearances, marginal contrasts do not legitimate splitting the language into separate subsystems.

2. A marginal contrast in RP

Wells (1982) describes varieties of RP with a marginal long /æː/ vowel. Many RP speakers lack this contrast (it is not, for example, given in dictionaries), and show purely allophonic variation between [æ] before voiceless obstruents and [æː] elsewhere (e.g. Gimson 1989: 108). Wells (1982: 288ff.) states:

> Some RP speakers have a marginally contrastive long /æː/. It shows up in pairs such as *bad* [bæːd] vs. *pad* [pæːd], *glad* [glæːd] vs. *lad* [læːd]. Long [æ] may also occur before other lenis consonants, as *jam* [dʒæːm], *jazz* [dʒæːz]; but it is rare to find contrastive length of [æ] in environments other than that of a following /d/. […]
> The commonest basis for the contrast is that monosyllabic adjectives end in [-æːd] but nouns in [-æd]. Hence *bad*, *clad*, *glad*, *mad*, *sad* have the long vowel, but *cad*, *dad*, *fad*, *pad* the short one. The verbs *add*, *had* are variable. The adjective *trad*, being a reduction of the polysyllable *traditional*, is short. The opposition is usually retained before *-ly* and the inflectional endings *-er*, *-est*, so that *badly* fails to rhyme with *Bradley*, while *mad#der* 'more mad' is [ˈmæːdə], distinct from *madder* '*Rubia* plant, red dye' [ˈmædə].

Wells' description implicitly invokes the notion of a subgrammar, since the syntactically delimitable class of adjectives is described as coming with 'add-ons' not found elsewhere in the language. Later in the same book, however, Wells (p. 346) appears to entertain a further hypothesis.

> [T]here is a good deal of disagreement among different individuals as to which TRAP words have the short vowel and which the long. It does seem possible, though, to make the generalization that the

> long vowel is particularly common in 'expressive' or 'informal' words. In any case, the opposition does not have a very high functional load.

The present author is a native speaker of RP and also has this contrast, but there are interesting divergences between the variety that Wells describes and my own, and yet I suspect a more systematic study of the relevant speakers would show that the distribution of the two sounds in my own speech is quite typical. Bye (2009) revisited the distribution of /æ/ and /æː/ but found little evidence to support either the subgrammar or the 'expressive' hypothesis. Although adjectives in [-æːd] are a highly salient cluster in the set of monosyllabic words with /æː/, at least one (synchronically) non-derived adjective, *clad*, has the short vowel [klæd] (cf. Wells, however, who reports a long vowel here), and at least four nouns, *none* of which end in /d/, have the long one: *man* [mæːn], *van* [væːn], *badge* [bæːdʒ], and *bag* [bæːg] also evince long /æː/. No non-derived verbs have this sound, although [hæːd] is marginally possible as a pronunciation of *had*. As Wells notes, the length of /æː/ is inherited in derived forms such as *sadly*, whose base shows the long vowel. The same is true of denominal verbs derived by affixation of a phonologically zero morpheme, which are fully productive and semantically transparent in English. Thus, with non-derived verbs such as *to bag*, in the sense of 'to appropriate', *to man*, meaning 'to serve on a ship as crew', and *to badge*, 'to buy up for the purposes of selling on', all pronounced with a short /æ/, it is possible to contrast the semantically transparent zero-derived verbs *to bag* (= 'to place in a bag, supply with a bag'), *to man* (a nonce formation which could mean 'to fix up with a date', e.g. *she got manned up for the party*), and *to badge* (e.g. 'to affix with a badge, show one's [police] badge'). The zero-derived verbs surface with the same vowel as found in the nominal stem, in this case long /æː/. Bye (2009) looked at the token frequency of monosyllabic TRAP words in the British National Corpus and found that the words with /æː/ all have high frequencies.[3] Since the non-derived verbs with /æ/, with the exception of *had* (which may have the long /æː/), are lower frequency, there is no basis for tying the contrast to a nominal subsystem that includes nouns and adjectives.

In the same way as the /ʒ/ exploited a gap in the English fricative system, the contrast between short /æ/ and long /æː/ reuses features that do significant work elsewhere in the system. Abstracting away from the various sets of diphthongs found in RP, there are two sets of monophthongs: six short, or 'checked' vowels /ɪ ɛ æ ʊ ʌ ɒ/, and five long, or 'full' vowels /iː ɜː uː ɔː ɑː/. In this system, there is both a front and a back vowel for each of the three vowel heights in the checked set, thus: /ɪ • ʊ/, /ɛ • ʌ/, /æ • ɒ/. In the set of full vowels, the high vowels /iː • uː/ form a front-back pair, as do /ɜː • ɔː/, but the back low full vowel /ɑː/ lacks a front congener in the more conservative varieties of RP. Since RP already has a front-back distinction in the low *checked* vowels, the extension of this contrast to the full set, as seen with the emergence long /æː/, may involve no additional cost. Indeed, positing a constraint that excludes /æː/ specifically may be more costly. A grammatical constraint against *æː specifically may do no more than duplicate in the grammar biases that are lexical in nature.

3. North Saami aspirated rhotic

North Saami (see e.g.: Nielsen 1926; Sammallahti 1998, 2002; Nickel and Sammallahti 2011) provides an example of a marginal segment with similarities to RP. The difference is that, in North Saami, the segment in question, the aspirated alveolar trill /^{h}r̥/, is by and large restricted to sound symbolic verbs designating sounds or movements with a marked noise or chaotic component. Phonemes with sound-symbolic value are not new. Joseph (1994), for example, showed that words with the affricates /ts/ and /dz/ in Modern Greek overwhelmingly fall into one of three semantic groups designating persons or things that are small or narrow, deformed in some way, or are the source of stings or burns. The list in (1)

[3] The nouns *van* and *badge* have lower frequency, but both are learned early, have referents that are a natural focus of interest, and therefore probably figure much more frequently in conversation at an early age.

is an exhaustive list of the verbs with this segment in the North Saami dictionary compiled by Kåven *et al*. (1995).

(1) *North Saami*

/ta^{h}̥ra-/	ta^{h}̥rraaht	'to shiver, tremble'
/tu^{h}̥ra-/	tu^{h}̥rraaht	'to sputter'
/tsi^{h}̥ra-/	tsi^{h}̥rraaht	'to whine, speak with a squeaky voice'
/paa^{h}̥ra-/	paa^{h}̥rraaht	'to roar (of a waterfall); to clamour'
/po^{h}̥ra-/	po^{h}̥rraaht	'to whorl, seethe; to scold'
/tʃa^{h}̥ra-/	tʃa^{h}̥rraaht	'to grate, laugh (like a magpie)'
/tʃoa^{h}̥ra-/	tʃoa^{h}̥riihiht	'to grate, jar'
/ki^{h}̥ra-/	ki^{h}̥rajðiht	'to russle for a while'
/mu^{h}̥ra-/	mu^{h}̥rajðiht	'to neigh softly'
/ska^{h}̥ra-/	ska^{h}̥rraaht	'to produce a râle, death rattle'
/sku^{h}̥ra-/	sku^{h}̥rraaht	'to snore, rumble'
/snu^{h}̥ra-/	snu^{h}̥rraaht	'to snore'

However, /^{h}̥r/ is not limited to verbs in this semantic cluster. The aspirated rhotic also occurs in three nouns, listed in (2) that seem to lack the sound symbolic dimension.

(2) *North Saami*

kaa^{h}̥riiht	'ugly, gnarled tree trunk'
ko^{h}̥raaht	'old horse, nag'
kaa^{h}̥ro	'row of new-mown hay'

North Saami also has other sonorants both plain /m n l r/ and aspirated /^{h}̥m ^{h}̥n ^{h}̥l/. The feature combination [+sonorant, spread glottis] is in general licit, implying a place for the aspirated rhotic. However, the semantic clustering is only observed for the aspirated rhotic /^{h}̥r/, but no obvious sound-symbolic value is attached to the other aspirated sonorants. The fact that /^{h}̥r/ is found largely in sound-symbolic verbs is thus a fact about the lexicon, not the grammar of North Saami.

4. The Afrikaans diminutive

Certain phonological structures appear to be restricted to certain morphological environments and appear to go against the principle that morphological operations cannot introduce novel contrasts (Structure Preservation). One putative example is the 'false diphthongs' associated largely with the morphologically derived environment of the diminutive in Afrikaans (e.g. Wissing 1971; Donaldson 1993). Afrikaans has eight short vowels /i y ɛ œ ə u ɔ ɐ/ and seven long vowels /iː yː ɛː œː uː ɔː ɑː/. The language is also rich in diphthongs, having a set of breaking (centralizing) diphthongs /eə øə[4] oə/ and another set of falling diphthongs ending in a high vowel. Donaldson (1993) distinguishes between ordinary diphthongs /əi œu œi/ and long diphthongs or 'double vowels' /ɑːi oːi ui iu/, although the basis of this distinction is not clear. Each of these diphthongs occur commonly in non-derived environments, as shown in (3).

[4] Although the usual transcription of this diphthong is /øə/, it may be more accurate phonetically to transcribe it as /eø/ or /eœ/, with the lip rounding on the second component. For many speakers today, this diphthong has merged with unrounded /eə/.

(3) *'True' diphthongs in Afrikaans*

/beən/	*been*	'leg'
/reøk/	*reuk*	'smell'
/oəx/	*oog*	'eye'
/smət/	*smyt*	'to chuck'
/xœut/	*goud*	'gold'
/fœil/	*vuil*	'dirty'
/mɑːi/	*maai*	'mow'
/roːi/	*rooi*	'red'
/sprui/	*sproei*	'to spray'
/liu/	*leeu*	'lion'

In addition to the 'true' diphthongs listed in (3), Afrikaans has 'false diphthongs', transcribed here as /ɑj ɔj ɛj/, which largely only occur as a result of the application of diminutive morphology. The phonology of the diminutive in Afrikaans is complex, and has never to my knowledge been provided a full analysis. I will simply sketch the barebones of a phonological account here and return to the issue more fully in a future paper.

The diminutive in Afrikaans has four major allomorphs, *-ie* /-i/, after stems ending in a voiceless obstruent /p k f s x/ (*lampie* [ˈlampi] 'lamp', *skyfie* [ˈskəifi] 'potato chip', *albatrossie* [ˈalbatrɔsi] 'albatros'), *-etjie* /-iki/, following consonant-final stems with a final short stressed nucleus (*vulletjie* [ˈfœliki] 'foal', *mahemmetjie* [maˈɦɛmiki] 'grey-crowned crane', *ringetjie* [ˈrəŋiki] 'ring'), *-pie* /-pi/ after stems ending in /m/ (*probleempie* [prʊˈbleəmpi] 'problem'), and *-(t)jie ~ -(d)jie ~ -kie* /-ki/ elsewhere.[5] I will assume for present purposes that the variation in shape is properly phonological, as opposed to due to phonologically conditioned lexically listed allomorphs, and derives from a single underlying form /-jki/ and various phonological processes operating at the morphological boundary between stem and diminutive suffix.[6] These processes will include deletion of the consonantal material of the suffix following an obstruent (/skəif+jki/→[ˈskəifi]), place assimilation following /m/ (along with deletion of /j/, e.g. /prʊˈbleəm+jki/→[prʊˈbleəmpi]), and vocalization of /j/ to [i] following a vowel. When added to a vowel-final stem, the /j/ of the suffix deletes (/mɑː+jki/→[ˈmɑːki]), as in (4).

(4) *Afrikaans diminutive*

/seə/	*see*	seəki	*seetjie*	'sea'
/bəi/	*by*	bəiki	*bytjie*	'bee'
/mɑː/	*ma*	mɑːki	*ma'tjie*	'mum'

In the general case, the /j/ and the /k/ of the suffix both delete when added to a stem ending in an obstruent. When added to a stem ending in /t/, however, it is the /t/ of the stem and the /j/ posited here as part of the suffix that delete, as in (5). The /j/ cannot surface following a diphthong (**nɛøjki*), or between consonants (**ɦarjki*).

[5] It is traditional to transcribe the *tj ~ dj ~ k* of the diminutive suffix as /c/, although phonetically a fronted velar rather than a true palatal. As such, it is indistinguishable from the allophone of /k/ that occurs preceding a front vowel, as in /kiri/ [ḳiri] *kierie* '(walking) staff'. The reason for the special treatment of the fronted voiceless velar stop in the context of the diminutive in some of the literature is the phonological variation in the preceding stem consonant and vowel. Here, however, we impute the palatalizing effect of the diminutive suffix to a /j/ in the underlying form of the suffix, obviating the need to posit an additional contrastive segment. We therefore break with the tradition and employ /k/ here.

[6] Previous analyses disagree as to whether the variation is truly phonological or phonologically conditioned allomorphy (on phonologically conditioned lexically listed allomorphs, see Paster 2006 and Bye 2007). De Villiers (1965: 189) holds the variants /-i/, /-pi/ and /-ki/ to be effectively phonologically conditioned lexical allomorphs ('sinonieme morfeme' in his terms), while Wissing's transformational generative account posits a single underlier and rules to derive the variation in surface shape.

(5) *Deletion of* /t/ *in diminutive*

/neøt/	*neut*	neøki, (*neøti)	*neutjie*	'nut'
/bœut/	*boud*	bœuki	*boudjie*	'buttock'
/skœit/	*skuit*	skœiki	*skuitjie*	'boat'
/nɑːl/	*nael*	nɑːlki	*naeltjie*	'nail'
/ɦɑrt/	*hart*	ɦɑrki	*hartjie*	'heart'
/pæːrt/	*perd*	pæːrki	*perdjie*	'horse'
/beəlt/	*beeld*	beəlki	*beeldjie*	'heart'

When the stem ends in a monophthong + /t/ or /nt/, the suffixal /j/ surfaces, giving rise to a derived diphthong. The examples in (6) illustrate the morphological derivation of 'true' diphthongs.

(6) *Deletion of* /t/ *and surfacing of* /j/

/mɑːt/	*maat*	mɑːiki	*maatjie*	'mate'
/fut/	*voet*	fuiki	*voetjie*	'foot'
/pœt/	*put*	pœiki	*putjie*	'well'
/pət/	*pit*	pəiki	*pitjie*	'seed, pip'

The examples in (7) show that the /j/ metathesizes with a preceding nasal, but not other sonorants, e.g. /ɑːnt + jki/ → *aːiŋki* 'evening', but /nɑːl + jki/ → *naːlki* 'nail', **naːilki*.[7]

(7) *Metathesis of* /j/ *with preceding nasal*

/ɑːnt/	*aand*	ɑːiŋki	*aandjie*	'evening'
/kənt/	*kind*	kəiŋki	*kindjie*	'child'

However, dipthongization also creates other vocalic clusters whose status is marginal. Examples are shown in (8).

(8) *Derived 'false dipthongs'* /ɑj ɔj ɛj/

/mɑt/	*mat*	mɑjki	*matjie*	'mat'
/ɦɑnt/	*hand*	ɦɑjŋki	*handjie*	'hand'
/pɔt/	*pot*	pɔjki	*potjie*	'pot'
/ɦɔnt/	*hond*	ɦɔjŋki	*hondjie*	'dog'
/bɛt/	*bed*	bɛjki	*bedjie*	'bed'
/prɛnt/	*prent*	prɛjŋki	*prentjie*	'picture'

It might be tempting to conclude on the basis of this data that Afrikaans has a separate diminutive grammar that characterizes clusters of short vowel + /j/ as well-formed. There are no examples of /ɛj/ occurring outside of diminutive, but /ɑj/ and /ɔj/ occur sporadically in non-derived words, shown in (9). Despite only occurring in a few very old loanwords, /ɑj/ is found in one of the most frequent words in Afrikaans, *baie* 'very, a lot'.

[7] Just as *tj* ~ *dj* ~ *k* of the diminutive suffix is traditionally transcribed with /c/, a preceding stem-final nasal is transcribed by some analysts as a palatal /ɲ/, e.g. Odendal (1955: 16), Posthumus (1969: 108), Wissing (1971: 111), thus *handjie* is rendered [haɲci]. De Villiers (1965), on the other hand, transcribes [haiŋci] with overt diphthongization of the preceding vowel. Donaldson (1993) transcribes both the palatalization and the diphthongization, e.g. [ɦaiɲci]. Since /ɲ/ is not independently attested in Afrikaans, I transcribe [ŋ] here. The palatalization is then merely a coarticulatory effect of the front environment that both precedes and follows.

(9) *Non-derived* /ɑj/ *and* /ɔj/ *in Afrikaans*

/ɑjɑ/	*aia*	'non-white nurse-maid'
/bɑjə/	*baie*	'very'
/frɑjəŋ/	*fraiing*	'fringe'
/kɑjɑ/	*kaia*	'native dwelling'
/xɔjəŋ/	*goiing*	'hessian'
/tɔjəŋs/	*toiings*	'in tatters'
/bɔjkɔt/	*boikot*	'boycot'
/tɔjlɛt/	*toilet*	'toilet'

The diminutive has such high frequency of use in Afrikaans that some diminutives have been relexicalized as base forms, e.g. *kelkie* 'wine glass' (synchronically not derived from *kelk* 'chalice, calyx'). The false diphthong /ɑj/ also occurs in such relexicalized diminutives, e.g. *mandjie* /mɑjŋki/ 'basket', which is synchronically non-derived. (The original root *mand*, which means 'basket' in Dutch, is obsolete.) Relexicalized diminutives may be productively diminutivized, thus: *mandjietjie* /mɑjŋkiki/ 'basket (DIM)'. The conclusion is that the combination of V+j /ɑj ɔj ɛj/ is unconditionally well-formed in Afrikaans, despite their low frequency outside the diminutive lexicon. These combinations emerge from the lexical specification of the diminutive and how the unique phonological grammar deals with concatenated morphemes.

5. The Javanese 'elative'

One well-known putative case of morphological override is the 'elative' in Javanese although, as we shall see, there are interesting differences to the Afrikaans diminutive. Despite homonymy with the term for the nominal case meaning 'out of' in languages like Finnish, the elative in Javanese is actually an intensive form of the adjective.

Let us take a look at the phonological backdrop. High vowels in Javanese may be [ATR] ('tense') or [RTR] ('lax'). On initial appearances, the distribution of Tongue Root features is governed by syllable structure, that is, tense high vowels are found in open syllables, while the lax vowels are found in closed syllables. This is exemplified in (10).

(10) *[ATR] / [RTR] (tense / lax) 'allophony'*

a.	pa.ɪt	'rice plant'
	i.sɪh	'still'
	gu.nʊŋ	'hill'
	be.sʊk	'future'
	pi.tɪʔ	'chicken'
	pi.kʊl	'to bear'
b.	pa.ri	'bitter'
	kɛ.li	'drifted'
	wɔ.lu	'eight'
	gu.ru	'teacher'
	pi.ti.ʔe	'his chicken'
	pi.ku.lan	'carrying pole'

Benua interprets the data as straightforward evidence for allophony and proceeds to develop an analysis using the following constraints in (11).

(11) *Constraints in Benua's analysis*

a. *ATR-CLOSED (Benua 1999: 5)
ATR vowels in closed syllables are prohibited.

b. *HI-RTR (cf. Archangeli and Pulleyblank 1994)
High RTR vowels are disallowed.

c. *HI-ATR
High ATR vowels are disallowed.

d. IDENT[TR]
Correspondent segments in the input and output agree in ATR/RTR.

Benua's analysis of the putative allophony (p. 7) takes due consideration of the Richness of the Base principle, whereby there are no (covert) restrictions assumed on the input. The correct surface allophone must therefore be returned by the grammar irrespective of which allophone is in the input as shown in the tableaux in (12).

(12) *[ATR] / [RTR] (tense / lax) as allophony*

a. iC]$_\sigma$ → ɪC]$_\sigma$; uC]$_\sigma$ → ʊC]$_\sigma$

	/apiʔ/	*ATR-CLOSED	*HI-RTR	*HI-ATR	IDENT[TR]
a.	**api**ʔ	*!		*	
b. ☞	**ap**ɪʔ		*		*

b. ɪC]$_\sigma$ → ɪC]$_\sigma$; ʊC]$_\sigma$ → ʊC]$_\sigma$

	/apɪʔ/	*ATR-CLOSED	*HI-RTR	*HI-ATR	IDENT[TR]
a.	**api**ʔ	*!		*	*
b. ☞	**ap**ɪʔ		*		

c. u]$_\sigma$ → u]$_\sigma$; i]$_\sigma$ → i]$_\sigma$

	/ibu/	*ATR-CLOSED	*HI-RTR	*HI-ATR	IDENT[TR]
a. ☞	**i.bu**			**	
b.	**i.b**ʊ		*!		*

d. ʊ]$_\sigma$ → u]$_\sigma$; ɪ]$_\sigma$ → i]$_\sigma$

	/ibʊ/	*ATR-CLOSED	*HI-RTR	*HI-ATR	IDENT[TR]
a. ☞	**i.bu**			**	*
b.	**i.b**ʊ		*!		

The elative is formed by making the final vowel of the stem high and tense. Crucially, tensing applies whether the final syllable is open or closed. Tensing in a closed syllable, however, goes against the canonical allophony between tense and lax high vowels. Benua (1999: 2) summarizes the generalization as follows:

> Elatives are the only Javanese words that allow ATR vowels in closed syllables. In all other classes of words, high vowels are subject to a closed-syllable retraction alternation driven by a ban on ATR vowels in closed syllables […]. Somehow, elatives escape this high-ranking constraint.

Examples of elative formation are given in (13). Base forms that end in an open syllable with a high vowel undergo no change (13a). Base forms that end in an open syllable with a non-high vowel undergo raising of the final vowel to the nearest high vowel (13b). The forms in (13c) show that a base form ending in a closed syllable not only evince raising of the final vowel, but but also tensing in violation of the putative ban on tense vowels in closed syllables.

(13) *Morphological tensing in Javanese 'elative'*

a.	/wani/	wa.ni	'bold'
	/lugu/	lu.gu	'ordinary'
b.	/rame/	ra.mi	'noisy'
	/idjo/	i.dju	'green'
	/rosɒ/	ro.su	'strong'
	/kəmbɒ/	kə.mbu	'insipid'
c.	/rindɪʔ/	ri.ndiʔ	'slow'
	/alʊs/	a.lus	'refined, smooth'
	/lurʊs/	lu.rus	'straight'
	/aŋɛl/	a.ŋil	'hard, difficult'
	/abɔt/	a.but	'heavy, hard'
	/gampan/	ga.mpin	'easy'

Assuming allophony is the correct account of the distribution of [ATR] and [RTR] in Javanese, this makes it necessary to provide an escape hatch for the elative. Benua (1999: 26) proposes the constraints in (14).

(14) *Benua's morphological constraints* (1999: 26)

a. MORPHEME-EXPONENCE
Morphological material has phonological realization.

b. MORPHEME-INTEGRITY
The elements comprising a morpheme are faithfully realized as a unit.

The constraint MORPHEME-EXPONENCE forces at least some of the phonological material of the affix to surface. Similar constraints under a variety of different names have been proposed, e.g. REALIZE MORPHEME. The same idea serves at the basis of Kurisu's (2001) Realizational Morphology. The second constraint, MORPHEME-INTEGRITY, is a purely *ad hoc* solution for dealing with a problem that Wolf (2007) identifies as a fundamental problem in all morpheme-realization-based approaches. MORPHEME-EXPONENCE is satisfied as long there is *some* phonological material of the affix that surfaces. Where the affix consists of more than one piece, segment or feature, MORPHEME-EXPONENCE will be satisfied even if some of the phonological content of the affix is suppressed in the output. But the Javanese elative consists of *two* pieces, the features [high] and [ATR], both of which surface. MORPHEME-INTEGRITY sees to it that, whenever one of the features surface, so does the other. The tableau in (15) illustrates how the morphological override analysis works. MORPHEME-EXPONENCE and MORPHEME-INTEGRITY both dominate the phonological constraint *ATR-CLOSED, which militates against tense vowels in closed syllables. In candidate (15a), none of the phonological material exponing the elative surfaces, incurring a fatal mark on MORPHEME-EXPONENCE. Candidates (15b) and (15c) both faithfully realize the elative morpheme but, since they each suppress one of the features, they incur a fatal mark on MORPHEME-INTEGRITY. Only candidate (15d) simultaneously satisfies MORPHEME-EXPONENCE and MORPHEME-INTEGRITY, albeit at the cost of violating the lower-ranked phonological constraint *ATR-CLOSED.

(15) *Morphological override*

	/abɔt + <elative>/	MORPH-EXPO	MORPH-INTEG	*ATR-CLOSED
a.	a.bɔt	*!		
b.	a.bot		*!	*
c.	a.bʊt		*!	
d. ☞	a.but			*

The realizational account ends up making some counterintutive predictions because of the Richness of the Base. It would be equally possible to imagine an 'anti-elative' suffix which was [high] and [RTR]. Added to a stem ending in an open syllable, the high rank of MORPHEME-EXPONENCE and MORPHEME-INTEGRITY would force a lax vowel to surface in an open syllable (e.g. hypothetical /rame/→ra.mɪ). Lax vowels never occur in open syllables in Javanese. Since the Richness of the Base entails that we cannot rule out an affix with these properties in the input, admitting MORPHEME-EXPONENCE and MORPHEME-INTEGRITY to the grammar leaves us completely at the mercy of the input.

Although Benua does not explore the possibility, the elative data could in principle have been dealt with using indexed constraints or cophonologies. Much recent research assumes that direct reference to morphology or lexicon in the grammar is *a priori* objectionable. In the study of non-concatenative phenomena, there is a move away from approaches that invoke morpheme exponence to truly morpheme-based approaches, where non-concatenative affects are the result of interaction between purely phonological constraints. Wolf (2007), Saba Kirchner (2010), Bermúdez-Otero (2012), and Bye and Svenonius (2012) are all representatives of this view. Similarly, Kager (2008) argues against the admission of diacritics to the grammar. For Kager, the grammar is exclusively responsible for determining the 'contrast space' within which alternations in a given language must occur. Any irregularity is to be captured by the lexicon, through lexical specification of the relevant property rather than through diacritics that trigger cophonologies or lexically indexed constraints. To facilitate his point, Kager provides a reanalysis of one famous case of exceptionality, that of Turkish devoicing. In the traditional account, underlying voiced stops are devoiced word-finally, e.g. /kɑnɑd/ 'wing' surfaces faithfully before a suffix beginning with a vowel, as in the accusative form *kanadɨ*, but with devoicing in the unsuffixed nominative: *kanat*. These words contrast with non-alternating voiceless stops, which may be analyzed as underlyingly voiceless, e.g. /sɑnɑt/ 'art', with nominative *sanat* and accusative *sanatɨ*. There is a class of exceptions, generally loanwords like /etyd/ 'study' (< French *étude*) that fail to undergo the expected final devoicing and which therefore do not alternate: nominative *etyd*, accusative *etydy*. The standard way of dealing with this is by upholding the reality of word-final devoicing and recognizing a class of diacritically marked exceptions.

The notion of exceptionality has been implemented in one of two ways in Optimality Theory, a unique grammar with lexically indexed constraints (Pater 2009), or separate lexically indexed grammars or cophonologies (Inkelas 1998; Inkelas et al. 1997; Inkelas and Zoll 2005; Orgun 1996, 1999; Orgun and Inkelas 2002). Kager argues that exceptionality is grammatically irrelevant. It is no more than a characterization of entries, or clusters of entries in the lexicon. For the Turkish case, the non-alternating obstruents are prespecified as [–voice] and [+voice] respectively or, perhaps, in privative terms, [spread glottis] and [voice]. The alternating roots like *kanat* ~ *kanadɨ* are laryngeally underspecified. Given that the lexicon does not specify, the grammar simply fills in with the preferred values, voiced intervocalically and voiceless word-finally. The grammatical exceptionality is replaced by a lexical three-way contrast.

The approach to non-concatenative effects developed in Bye and Svenonius (2012) similarly invokes judicious use of pre- and underspecification in lexical representations to rely on phonology to do the rest. We thus see a broadly conservative position emerging that eschews the idea of a lexicon that is able to make claims on the grammar. The effects are generated by the phonology given determination of the right underlying forms. This does not preclude the possibility of linguistically defined domains, such as those given by the syntax of the phase, triggering different phonological grammars, which would be one interpretation of morphological levels in Lexical Phonology. Other things being equal, though, phonological conservatism implies that morphological processes cannot introduce novel contrasts, i.e. violations of Structure Preservation can only be apparent. For Javanese, this entails that [ATR] vowels in closed syllables are in principle lexically contrastive and can be found outside the elative. In order to test this, I did some prospecting in Horne's (1974) Javanese-English dictionary. As (16) shows, there are in fact simple words (i.e. that lack any elative morphology) evincing high tense vowels in closed syllables. Many of these belong to the 'expressive' vocabulary, but not all. There are several loanwords with a high tense vowel in the final closed syllable, as well as a couple of other entries, which may be native.

(16) *Lexical [ATR] in closed syllables* (data from Horne 1974)

a. *Ideophones*

prit	'tweet'
din	(sound of a horn honking)
huk	'bow-wow'
kərkit	'creaking (of bedsprings)'

b. *Interjections*

amin	'Amen'
blaiʔ	(an expression of fear and alarm)

c. *Nouns, adjectives and verbs referring to movements, emotional states, easily caricatured qualities*

bəkik	'to shriek repeatedly'
dzəpit	'place to squeeze into for concealment'
dzidzik	'disgusted'
gənit	'sexy, flirtatious'
gliŋ	'somewhat deficient mentally'
iklik	'to keep occupied'
kənduruʔ	'hanging in loose folds'
məmbiʔ	'with face screwed up ready to cry'
məndip	'to flicker'
ɲətutur	'sitting around doing nothing'

d. *Lexical borrowings*

bit	'beet, sugar'
dzip	'jeep'
pit	'bicycle' (< Dutch *fiets*)
rematik	'rheumatism'
saʔduk	'handkerchief' (< Dutch *zakdoek*)

e. *Other (native?)*

əntsim	'sister'
miʔ	'to nurse'

The frequency of high tense vowels in closed syllables is patently low. However, if exceptionality is grammatically irrelevant, then the distribution of [ATR] and [RTR] in Javanese must be described differently: it cannot be a case of allophony. [RTR] vowels cannot occur in open syllables, but [ATR] vowels can occur in closed syllables other than the elative. [ATR] vowels in closed syllables correlates strongly with expressive function, but the division is not watertight. We can conclude that elative morphology implies no violation of Structure Preservation since [TR] is marginally contrastive in closed syllables in the non-derived lexicon. Therefore there is no need to invoke morphologically sensitive grammatical devices, whether these be MORPHEME-EXPONENCE, elative-indexed constraints, or an elative cophonology. The phonology of [TR] and syllable structure may be reanalyzed as neutralization (18). In addition to *ATR-CLOSED, we posit a constraint *RTR-OPEN in (17).

(17) *RTR-OPEN
RTR vowels in open syllables are disallowed.

(18) *[ATR] / [RTR] (tense / lax) through neutralization*

a. $iC]_\sigma \rightarrow iC]_\sigma$; $uC]_\sigma \rightarrow uC]_\sigma$

/miʔ/	*RTR-OPEN	IDENT[TR]	*ATR-CLOSED
a. ☞ **mi**ʔ			*
b. **m**ɪʔ		*!	

b. $\text{ɪ}C]_\sigma \rightarrow \text{ɪ}C]_\sigma$; $\text{ʊ}C]_\sigma \rightarrow \text{ʊ}C]_\sigma$

/apɪʔ/	*RTR-OPEN	IDENT[TR]	*ATR-CLOSED
a. **api**ʔ		*!	*
b. ☞ **ap**ɪʔ			

c. $i]_\sigma \rightarrow i]_\sigma$; $u]_\sigma \rightarrow u]_\sigma$

/ibu/	*RTR-OPEN	IDENT[TR]	*ATR-CLOSED
a. ☞ **i.bu**			
b. **i.b**ʊ		*!	

d. $\text{ɪ}]_\sigma \rightarrow i]_\sigma$; $\text{ʊ}]_\sigma \rightarrow u]_\sigma$

/ibʊ/	*RTR-OPEN	IDENT[TR]	*ATR-CLOSED
a. ☞ **i.bu**		*	
b. **i.b**ʊ	*!		

The correlation between tenseness in closed syllables and the expressive aspect seems in Javanese at least to be related to what Gussenhoven (2004: 71ff.) dubs the 'Effort Code'. There is a well-known correlation between F0 and the size of the organism, since smaller larynxes produce higher frequencies than larger ones. Ohala (1983) showed that this correlation may be exploited for communication purposes in what he calls the Frequency Code. Higher pitch signals insecurity, by extension doubt, politeness or interrogation. Lower pitch signals assurance, by extension authority, declarativeness. Gussenhoven similarly identifies an Effort Code in intonation. Variation in effort is connected with the size of the pitch excursion. Greater effort results in wider excursions. Increase in effort is also known to result in greater articulatory precision (de Jong 1995), creating conditions for recruiting hyperarticulation for the paralinguistic signalling of enthusiasm and engagement. Although Javanese allows tense vowels in open syllables, elative vowels are tenser in closed syllables than they otherwise would be. The tenseness associated with the elative may thus represent the lexicalization of the Effort Code to communicate intensity. The expressive vocabulary of Javanese also systematically exploits the Frequency Code through vowel quality. Uhlenbeck (1978 [1971]: 145) writes:

> [N]ext to *kĕmrĕsĕk* 'to rustle', also the forms *kĕmrasaq*, *kĕmrosoq*, *kĕmrusuq*, *kĕmreseq* and *kĕmrisiq* may occur. They all denote rustling sounds with different degrees of loudness and clearness. They may be said of a great variety of things (leaves, a waterfall etc.). As in many other languages, the forms with a palatal vowel tend to indicate lower, more gentle and clearer sounds produced by small objects, while the forms with a velar vowel tend to indicate loud, dull or hollow sounds produced by large and heavy objects. For instance *kĕmrĕsĕk* may be used of a new *klambi* (blouse) which because of its newness makes a faint rustling sound, while *kĕmrisiq* is regularly used for indicating the sound made by running mice, *kĕmrasaq* and *kĕmrusuq* for the rustling sounds which bigger animals (deer and the like) may make when forcing their way through the underbrush. Or, to give another example: *kĕmlinṭiŋ* 'to twinkle', may be said of small metal bells, of a bicycle or of the cart of an ice-cream vendor, while *kĕmlunṭuŋ* is is used for the heavy sound produced by a big gong, *kĕmlonṭoŋ* for the hollow sound produced by the wooden bells or rattles used by Chinese textile-vendors. It should be stressed that in Javanese the occurrence of these onomatopeic and phonaesthetic forms is not incidental, but completely systematic.

Given the availability of diacritic devices, the systematicity of the correlation between sound-symbolic vowel quality and the size or intensity of the real world model begs the question why there should not be separate 'grammars' for onomatopoeic words descriptive of high-pitched sounds made by small things as opposed to words describing low-pitched sounds made by large things.

6. Conclusions

Marginal structures may have low frequency, but they are structure preserving and may be seen as exploiting accidental gaps in the inventory. Their marginality is not a fact that has direct relevance for the grammar, but simply reflects the statistical structure of the lexicon. Nonetheless, certain marginal structures appear to be restricted to certain semantic or derived morphological environments. The attempt to model these correlations by positing subgrammars, modeled through lexically indexed cophonologies or constraints, multiplies entities beyond necessity and is empirically problematic. Rather than well-defined lexical strata, what we instead find is fuzzier lexical regions, which may have the highest concentrations of the marginal structure in the language, but they are not self-contained. The marginal structure inevitably occurs in the general lexicon. The reasons for clustering according to meaning or morphological structure must be sought elsewhere, in language history, or in poiesis — the way in which we fashion novel words analogically, albeit using the discrete combinatorial resources at our disposal, in a way that reinforces phonaesthetic connections between words.

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