On diminutives and plurals in Moroccan Arabic

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Plural nouns in Moroccan Arabic (henceforth MA), like in many other Afroasiatic languages, can be formed through internal or external morphological operations; the nouns are thus distinguished as either 'broken' (internal) or 'sound' (external). In many cases, however, a single noun displays both plural forms (for instance, *tˤasˤwera* 'photo' has plurals *tˤsˤawər* and *tˤasˤwerat*; *gamila* 'bowl' leads to *gwaməl* and *gamilat*). Interestingly, the diminutive systematically resorts to *-at* suffixation in the plural: *tˤsˤewera* 'small photo' and *gwimila* 'small bowl' form their plurals as *tˤsˤewerat* and *gwimilat* respectively.

The fact that all diminutive forms select for external plurals suggests some kind of constraint that prohibits infixing the diminutive and plural markers at the same time. From a phonological point of view, there is no reason why such infixes cannot co-occur in the same form. Therefore, the resulting alternation in the plural formation, which can be viewed as a type of allomorphy, will be argued to follow from a templatic constraint that forces diminutives to systematically use suffixation when pluralized. It will be shown that the diminutive and the plural infixes compete for the same templatic position, resulting in forms where only the diminutive marker surfaces.

The broken and sound plurals that nouns like *tˤasˤwera* and *gamila* display will be shown to involve a crucial semantic contrast: *tˤasˤwerat* and *gamilat*, indicate a definite number, usually occurring with numerals, whereas *tˤsˤawər and gwaməl* have a collective reading. This contrast along with the morphological differences will be accounted for by positing that broken and sound plurals reside in different syntactic locations. The latter will be argued to be associated with the standard *Num* projection, whereas the first are associated lower in the structure with the *n* projection. External evidence in favour of this analysis is drawn from the phenomenon of emphasis spread. It will be shown that the emphatic coronals spread their feature to the neighbouring segments within the *nP* domain. That is to say, broken plurals containing an emphatic consonant will be entirely emphaticized, while sound plurals will be affected only partially. The same reasoning holds for diminutives, whose singular forms are fully emphaticized.

This paper is structured as follows. Section 1 discusses the semantic and morphological differences between broken and sound plurals in MA. A morpho-syntactic analysis is proposed, which aims to capture these differences. Section 2 turns to diminutives. A templatic approach is developed in order to explain why diminutives systematically resort to *-at* suffixation in the plural. Section 3 provides phonetic and phonological evidence for the analysis proposed in section 1: emphasis is argued to spread within the domain of nP. Section 4 concludes the paper.

1. Plurals in Moroccan Arabic nouns

Nouns in MA are marked for singular and plural, but lack the dual of Classical Arabic. Plurals are generally formed by means of infixation (e.g. *wǝld* / *wlad* 'boys'), vowel alternation (e.g. *ktaːb* / *ktuːb* 'books') or suffixation (e.g. *muʔǝllim* / *muʔǝllim-in* 'teacher.MS'; *ħrajfi* / *ħrajfij-a* 'craftsman'). Note that the suffix *–a* also occurs in the feminine forms (e.g. *ħrajfij-a* 'craftswoman'; *xǝjjatˤ* 'tailor.MS' / *xǝjjatˤ-a* 'tailor.FM'). Further details and analysis are provided in Heath (1987).

Nouns displaying more than one plural form are not specific to Arabic. Many other languages in the Afroasiatic family, such as Somali, Hausa and Amharic, have been reported to show similar forms (see Newman 2000: 463 on Hausa, Puglielli and Siyaad 1984 and Lecarme 2002 on Somali, and Kramer 2012: 227 on Amharic). In most cases, these forms involve so-called double pluralization, whereby one plural form derives from another plural. In Amharic, for instance, singular *mämhïr* 'teacher' leads to plurals *mämhïran* and *mämhïranotʃïʃ*. Likewise, Somali *naág* 'woman' has plurals *naagó* 'women' and *naagayáal* (⟵ /naag+o+yaal/) 'groups of women',[1] and Hausa *dóːkìː* 'horse' has plurals *dáwáːkíː* and *dàwàːkái*. In MA, however, there are very few double plurals, such as *mwasat* 'knives' (plural of plural *mwas*) and *qwasat* 'arches' (plural of plural *qwas*). In this section, we focus on the analysis of nouns that have two independent plural forms in MA, as illustrated in (1).

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[1] One might argue that affix ordering in double plurals runs counter the hypothesis put forth here since the suffix *-ó,* which derives regular plurals, is added before *-yáal.* Yet these formations differ from the ones at hand in MA since they involve double pluralization. As far as the parallel holds, we can assume that Somali plurals using *-ó* are generated under nP (see Lecarme 2002: 193), similarly to what we propose for MA internal plurals.

(1)	*Singular*	*Broken plural*	*Sound plural*	
a.	muʒa	mmʷaʒ	muʒat	'waves'
	baliza	bbʷalz	balizat	'suitcases'
b.	ʕdˤəm	ʕdˤam	ʕədˤmat	'bones'
	dˤelʕa	dˤloʕ	dˤəlʕat	'muscles'
c.	qamiʒa	qwamʒ	qamiʒat	'shirts'
	gamila	gwaml	gamilat	'bowls'
d.	blasˤa	blajəsˤ	blasˤat	'places'
	ksˤedˤa	ksˤajədˤ	ksˤedˤat	'smashes'

These examples involve native words and loans alike. They are classified depending on the morphological operations used in the broken plurals: gemination in (1a), vowel insertion in (1b), -wa- infixation in (1c) and -jə- infixation in (1d); sound plurals invariably resort to –at suffixation. Interestingly, broken plurals are often semantically associated with collective readings, while sound plurals are count nouns referring to a definite number, especially when used with a numeral.[2] One could argue that this semantic distinction is subject to variation—that certain broken plurals can indicate definite numbers. However, as far as we know, sound plurals are hardly ever associated with collective readings. None of the sound plurals listed above indicates an indefinite number, especially not when used with a numeral. Furthermore, it is worth noting that -at suffixation entails feminine gender, regardless of the gender of the singular. This is manifested through agreement relations as in the following examples, where *ʕadˤmat* 'bones' (2a) is feminine while singular *ʕdˤəm* 'bone' (2b) and internal plural *ʕdˤam* (2c) are masculine.[3]

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[2] One of the anonymous reviewers rightly pointed out that certain numerals in MA select broken plurals. For instance, *tlata* 'three' can be used with broken plurals, as opposed to *ʒuʒ* 'two' which combines with sound plurals. In fact, these numerals behave differently since they involve distinct syntactic structures.

    a. *tlata*   *d*   *ttˤsˤawər*   b. *ʒuʒ*   *tˤəsˤwerat*
       three   of   the-photos   two   photos
       'three photos'   'two photos'

As the careful reader will have noticed, a genitive preposition *d* intervenes between *tlata* and the following broken plural but not between *ʒuʒ* and its sound plural. The complement of the genitive preposition when plural can be only internal, with a collective reading which requires a numeral in order to be quantified. For the sake of completeness, we should also note that the absence of the genitive preposition in (b) leads to a construct state formation where the sound plural *tˤəsˤwerat* occurs without a determiner, as opposed to the broken plural *ttˤsˤawər* whose geminate results from the concatenation of the determiner *l-* and the stem-initial consonant.

[3] One could argue that *ʕadˤmat* alternates with feminine singular *ʕadˤma* whereas masculine *ʕdˤəm* has plural *ʕdˤam*, therefore suggesting that masculine forms select only internal plurals while feminine forms opt for external plurals.

(2)

a. ʒuʒ   Ɂədˤm-at   qasˤħ-at
    two   bone-FM.PL   tough-FM.PL
    'two tough bones'

b. Ɂdˤəm   qasˤəħ
    bone-MS.SG   tough-MS.SG
    'a tough bone'

c. Ɂdˤɑm   qasˤħ-in
    bone-MS.PL   tough-MS.PL
    'tough bones'

The facts just discussed suggest that MA broken and sound plurals reside in distinct syntactic positions. Following Lahrouchi & Lampitelli (2014), we assume that sound plurals in MA are associated with the standard *number* projection (*numP*), whereas broken plurals are associated lower in the structure with the *noun* projection (*nP*).[4] The forms represented in (3) illustrate the analysis.

(3)   a. *ʕdˤam* 'muscles'   b. *ʕədˤmat* 'muscles'
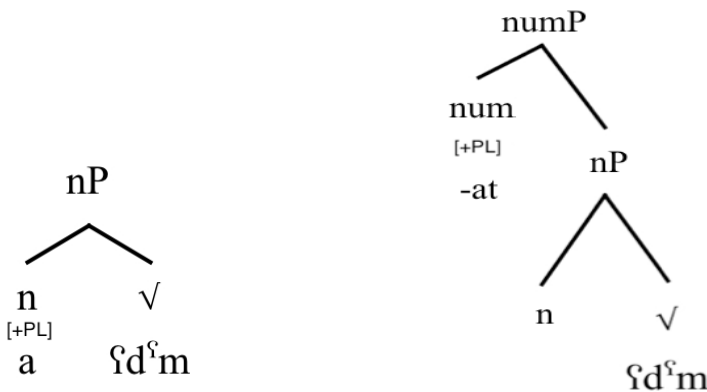
According to Marantz (2001 and 2007; see also Embick & Marantz 2008, and Embick & Noyer 2007: 296), roots are acategorial. As such, they need to combine with functional heads

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This correspondence is, however, far from being systematic as we find plenty of feminine nouns which resort to internal plural formation. Singular forms ending with –a in (4) are actually feminine but they all have internal plurals as well as external ones. The behaviour of feminine nouns clearly shows that gender specification is irrelevant in the choice of the type of plural formation.

[4] The reader is referred to Lowenstamm (2008), Acquaviva (2008) and Kramer (2012) for further details about number and plurality.

such as *v*, *n* or *a*, the first category-determining heads in the syntactic structure. In line with this proposal, we assume that *ʕdˤam* (3a) is formed by combining the head *n,* which has a plural feature, with an acategorial root, while *ʕədˤmat* (3b) obtains its plural feature higher in the structure, from numP. These structures allow one to capture the morphological and semantic differences that broken and sound plurals display. Moreover, the lower location of broken plurals, close to the root, accounts for their morpho-phonological irregularity, while the higher location of sound plurals represents their regularity and their high productivity in most noun classes.[5] It is worth noting that loanwords (e.g. *taksi* 'cab' / *taksiyat* 'cabs', *tˤobis* 'bus' / *tˤobisat* 'buses') and diminutives, to which we will turn in the following section, all resort to *–at* suffixation. The same holds for mass nouns, especially when used with numerals (e.g. *zitun* 'olive' / *ʒuʒ zitunat* 'two olives', *xubz* 'bread' / *ʒuʒ xubzat* 'two loaves of bread').[6] This is somewhat consistent with Borer's proposal (2005: 96) according to which nominalized roots are basically interpreted as mass before additional functional structure is added to derive a count reading. The parallel is simplified here for expository reasons. Strictly speaking, Borer suggests that roots are acategorial and unspecified for mass or count, but assigning a count reading to a root requires additional functional projections compared to a mass reading. In the same vein, the collective reading associated with broken plurals in MA can be assumed to be derived lower in the structure than the count reading assigned to sound plurals.

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[5] See Marantz (2001, 2007, 2013) and Arad (2003, 2005) who show that words derived by combining a root and a category-defining head are more prone to morpho-phonological and semantic irregularities, as opposed to words derived from other words.

[6] In MA, mass nouns are singular just as English *water* and *sugar*. This is expressed through their agreement:

e.g. l-hut   ɣali
the-fish expensive.SG
'Fish is expensive'

Their plural, systematically formed by means of *-at* suffixation, makes them count. This further argues for the fact that sound plurals indicate a definite number.

2. Diminutives

2.1. An overview of diminutive formations

Cross-linguistically, diminutives denote smallness or endearment. They are generally assumed to be derived from other words, usually nouns, by adding a suffix, as in English *sweetie*, *doggy* and *booklet* or in Italian *finestrella* 'little window' and *casetta* 'little house'. In French, feminine nouns tend to use the suffix –*ette* (e.g. *maisonette* 'little house', *fillette* 'little girl'). Masculine nouns may also use this suffix switching their gender into feminine (e.g. *camion* 'truck' / *camionette* 'little truck', *char* 'tank' / *charrette* 'cart'), while others use –*on* [ɔ̃] or –*ot* / –*eau* [o] (e.g. *oisillon* 'small bird', *chaton* 'kitten', *chariot* 'trolley', *baleineau* 'calf, young whale'). In certain cases, however, these suffixes are hardly associated with a diminutive meaning. For instance, it is not clear how small is *ballon* 'ball' compared to *balle* 'ball' nor is it obvious that *salon* 'living room' is a diminutive of *salle* 'hall' (the reader is referred to Lowenstamm 2008 on this issue).

In many branches of the Afroasiatic family, including Berber, Cushitic and Chadic, feminine markers are used to derive diminutives. For example, in Tashlhiyt Berber, *t-* prefixed and suffixed to masculine nouns indicates not only feminine but also a small size: e.g. *afus* 'hand' / *t-afuss-t* 'small hand', *aɣalim* 'reed' / *t-aɣalim-t* 'small reed, fishing rod', compared to the masculine gender which can be used as an augmentative (e.g. *t-akur-t* 'ball' / *akur* 'big ball', *t-agrtil-t* 'mat' / *agrtil* 'large mat'). Similarly, Gidar (a Chadic language) uses the feminine suffix –*k(ə´)* to mark diminutive as in *gəmdá-kə* 'small chicken' and *kə´r-k* 'small dog' (cf. Frajzyngier 2003: 86, 2008). Semitic languages such as Arabic and Hebrew opt for internal morphology to mark the diminutive, though in the latter case the process is predominantly suffixal (cf. De Belder *et al.* 2015).

In Classical Arabic (henceforth CA), diminutives show a regular prosodic pattern, typically of the form CuCajC, which varies slightly depending on the number and length of base segments: e.g. *kulajb* 'small dog' / *kalb* 'dog', *nufajs* 'small soul' / *nafs* 'soul', *kutajjib* 'little book' / *kita:b* 'book', *sulajtˤiːn* 'little Sultan' / *sultˤaːn* (cf. McCarthy & Prince 1990: 222). MA uses almost the same pattern, except for the absence of the vowels *u* and *a* in the surface form. Following Lowenstamm (1991), we will argue later in this section that this phenomenon results from the absence of phonologically short peripheral vowels in Moroccan Arabic.

2.2. Diminutives in Moroccan Arabic

The data in (4) illustrate the various forms of diminutives in MA. The reader is referred to Elmdari (1999), Boudlal (2001) and Arbaoui (2015) for further examples.

(4)

	Singular	Plural	Diminutive	Plural of diminutive	
a.	bəlɣa	blaɣi	bliɣa	bliɣat	'slipper'
	dəmʕa	dmuʕ	dmiʕa	dmiʕat	'tear'
	kura	kwari	kwira	kwirat	'ball'
b.	bənt	bnat	bnita	bnitat	'girl'
	dˤar	dˤjor	dwira	dwirat	'house'
	ʕin	ʕjun	ʕwina	ʕwinat	'eye'
c.	wəld	wlad	wlijjəd	wlijdat	'boy'
	ʒməl	ʒmal	ʒmijjəl	ʒmijlat	'camel'
	sˤbəʕ	sˤbaʕ	sˤbejjəʕ	sˤbejʕat	'finger'
d.	ktab	ktub	kʷtijjəb	kʷtijbat	'book'
	kəlb	klab	kʷlijjəb	kʷlijbat	'dog'
	qəlb	qlub	qʷlijjəb	qʷlijbat	'heart'
e.	bit	bjut	bbʷijjət	bbʷijtat	'room'
	mus	mwas	mmʷijjəs	mmʷijsat	'knife'
	buq	bwaq	bbʷijjəq	bbʷijqat	'loud speaker'
f.	sərwal	srawəl	sriwil	sriwilat	'pants'
	tˤəbsˤel	tˤbasˤəl	tˤbesˤel	tˤbesˤelat	'plate'
	dəbliʒ	dbaləʒ	dbiliʒ	dbiliʒat	'bracelet'

These data are sorted into six classes depending on the way the diminutive is formed. Plurals are given for both diminutive and non-diminutive forms in order to show how the diminutive impacts the plural. In terms of surface syllabic structure, all diminutive singulars consist of two syllables regardless of the number of syllables in the base form.[7] A more interesting generalisation is that the infix –i– is inserted between the last two consonants of all diminutives: basic feminine forms in (4a,b) use this infix along with the suffix –a, which marks

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[7] Some authors, arguing that MA does not allow complex onsets, view these forms as having three syllables, (Boudlal 2001, Kiparsky 2002, Dell and Elmedlaoui 2002). A form like *bnita* is thus syllabified [b.ni.ta], where /b/ stands for a syllable of its own (see also Shaw et al. 2010).

feminine, while the remaining masculine forms involve –*ijj*- infixation (4c-e),[8] with the exception of quadriconsonantals (4f) which display –*i*- twice; between C_2 and C_3, and between C_3 and C_4. The data also show forms with a velar or uvular C_1 that undergoes labio-velarization in the diminutive. This feature probably originates from the loss in MA of the vowel *u* found in CA diminutives. This will be used later as evidence in favour of the assumption that CA short vowels are dropped in MA while long vowels surface as short.

The crucial observation for the purpose of our analysis is that all diminutives in MA resort to –*at* suffixation in the plural while their base forms may select for broken plurals. The question is why diminutives like *bliɣa* and *wlijjəd* do not form their plural by means of infixation, combining both markers in the same form.

In what follows, we will attempt to provide an answer to this question by arguing that the plural of diminutives can only be external, as the templatic site located between the last two radicals hosts the diminutive infix.

2.3 A templatic approach

Before turning to the role of the template in deriving MA diminutives, let us briefly review some alternative approaches to the regularity of these forms. This regularity can be accounted for in terms of prosodic circumscription à la McCarthy & Prince (1990), be it representational or constraint-based. As in the case of CA plurals and diminutives, one can argue that in MA each diminutive form has to display a LL or LH iamb. This is actually consistent with the data in (4), as long as we consider the intervocalic geminates to be weightless. For instance, a form like *wlijjəd* 'little boy' could be syllabified into LH, where the ambisyllabic geminate does not contribute to weight.

The diminutive marker can be analysed as a suffix attached to a circumscribed part of the base which corresponds to a minimal syllable of the form CV or CəC (El Ghadi 1990, Bennis 1992). For example, *wəld* 'boy' can be analysed as wəl<d> where the bracketed consonant is not part of the circumscribed target for affixation. The diminutive marker is suffixed to the circumscribed syllable, leading to *wəlid,* whose schwa is not realized since followed by a consonant-vowel sequence (see 2.3.1 for details about ə/ø alternations in MA). Then a default syllable *jjə* is added in order to satisfy a LH iambic foot, resulting in the form *wlijjəd,* in which

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[8] It should be noted here that j-gemination is subject to variation. According to Elmdari (1999 : 82), forms like in (4c-e) display a non-geminated glide in the MA variety of Marrakech.

geminated *jj* does not contribute to weight (see El Ghali 1990 and Boudlal 2001: 252 for further details about this analysis).[9]

Any phonological theory that wants to account for the diminutive data should involve a clear definition of the possible kinds of interaction between phonology and morphology, and it should capture the co-occurrence restrictions that the diminutive and the broken plural markers display. That is, it should explain why the diminutive marker is always infixed exactly where the broken plural is expected, forcing all diminutives to use the suffix –*at* in the plural. In the remainder of this section, we will bring out more explicitly the templatic mechanism responsible for this phenomenon. To do so, we need to outline the main assumptions about the representation of the skeletal tier and the syllable structure in the framework adopted here.

2.3.1. CVCV model

The CVCV model (Lowenstamm 1996), which falls within the framework of Government Phonology as outlined in Kaye, Lowenstamm & Vergnaud (1990), holds that syllable structure universally reduces to a strict alternation of non-branching onsets and non-branching nuclei, *viz.* C and V positions. These positions interact laterally to derive different surface syllable types. Only consonantal segments are linked to C positions and only vocalic segments appear in V positions. The differences in the surface syllabic structures lie in the way segments are associated to the skeletal tier. That is, in a closed syllable, the consonant in the coda position is followed by an empty V position, a branching onset and a geminate contain an empty V between its consonants, while a long vowel contains an empty C. This is illustrated below in (5).

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[9] Such prosodic analyses are tenable only at the expense of stipulating that neither ambisyllabic geminates nor word-final consonants contribute to weight. In addition, as Boudlal (2001: 253) noticed, prosodic circumscription fails to account for forms like *ʒməl* 'camel' since the diminutive suffix should be added after the circumscribed syllable *məl*, leading to *ʒəmli rather than *ʒmijjəl*. Similar problems arise with biconsonantal bases such as *bit* 'room', in which neither a CV nor a CəC syllable type is available.

(5)

	closed syllable		*branching nucleus*		*branching onset*		*geminate*	
a.			*b.*		*c.*		*d.*	

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   b   a   r              b       a            b   r   a            b       a
   |   |   |              |      / \           |   |   |           / \      |
   C   V   C   V          C   V   C   V        C   V   C   V       C   V   C   V

       [bar]                  [ba:]               [bra]               [bba]
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In addition, skeletal positions that have no phonetic realization are licensed to remain empty by virtue of the government relation that they share with the neighbouring segments. Proper Government (PG) is one such relation, allowing a vocalic position to remain empty when followed by a vowel. This proves particularly interesting in explaining the ə/ø alternation in Moroccan Arabic. For example, *qləb* 'he reversed' where the V position between /q/ and /l/ is properly governed by the following schwa and thus remains empty (6a), in contrast with *qəlbu* 'they reversed' where the same position, non-governed, surfaces as schwa (6b).

(6)

a.   *qləb* 'he reversed'

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              PG

  q          l   ə   b
  |          |   |   |
  C   V   C   V   C   V
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b.   *qəlbu* 'they reversed'

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                  PG

  q   ə   l       b   u
  |   |   |       |   |
  C   V   C   V   C   V
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This kind of lateral relation proves necessary in explaining why the schwa following the diminutive infix in the forms in (4c-e) like *wlijjəd* is dropped when the plural suffix *–at* is added. Within the CVCV approach, the V position between *j* and *d* surfaces as schwa in *wlijjəd* since it is not governed, but remains empty in *wlijdat* since it is governed by the following *a*. At the same time, we notice that the diminutive infix surfaces with a geminated glide in the singular diminutive forms in (4c-e) but not in the corresponding plural forms. In other words, the glide

geminates when followed by schwa and remains unchanged when followed by a consonant. We will turn back to this point later in section 2.3.3.

2.3.2 MA peripheral vowels

Another issue that needs to be addressed before turning back to diminutives relates to the phonological representation of MA vowels. MA has only four vowels, three of which are peripheral /i, a, u/. The fourth vowel is a schwa, whose distribution is phonotactically predictible as shown in the examples represented in (6). In certain cases, /i/ and /u/ may surface as mid-vowels [e] and [o], especially when pharyngealized or adjacent to a guttural consonant (see section 3 for examples and discussion).

Following Lowenstamm's hypothesis (1991) about the vocalic system of Maghribi Arabic and Ethio-Semitic, we assume that the peripheral vowels of MA are associated with 'branching nuclei'. The parameter is stated as follows:

(7)   In MA, peripheral vowels must be associated with two V positions.

According to this parameter, the representation of the three peripheral vowels of MA follows under (8).

(8)   *skeletal level*   CVCV   CVCV   CVCV

       segmental level   I   U   A
       phonetic realization   [i]   [u]   [a]

Note that the parameter in (7) is a condition on the association of vocalic elements to the skeletal level. It does not affect the segmental level. Thus, the three peripheral vowels always surface as short vowels, viz. [i], [a] and [u].

The correspondences between MA and CA endorse the above proposal. Indeed, in a number of items shared by these languages there is a regular change whereby the long vowels of CA correspond to phonetically short vowels in MA. Short vowels in CA disappear in MA, leading to a situation where any position that is not properly governed surfaces as schwa. In contrast, singleton and geminate consonants in CA are preserved as such in MA. The examples in (9) illustrate these correspondences.

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(9)   *Classical Arabic*   *Moroccan Arabic*

    a.   ʒaːhada   ʒahəd   'fight'

          saːfara   safər   'travel'

          kitaːb   ktab   'book'

          baħr   bħər   'sea'

    b.   farraqa   fərrəq   'divide'

          ʕaððaba   ʕəddəb   'torture'

          ʕallama   ʕalləm   'teach'

          fakkara   fəkkər   'think'

The parameter in (7) characterizes these correspondences by distinguishing the vowels that occupy two vocalic positions from those that have access to only one position. The first surface as short in MA, while the latter remain silent.

2.3.3 A templatic effect

Templatic morphology, which goes back to McCarthy's seminal work (1979, 1981) on verb conjugation in Classical Arabic, offers an interesting descriptive potential, some aspects of which meet with the facts discussed in section 2.2. McCarthy's work has taken advantage of autosegmental representations. The idea is that linear objects such as *kattab* 'he made write' decompose into distinct morphemes, one of which is the template whose shape allows deriving medial consonant gemination, as opposed to vowel-lengthening in *kaːtab* 'he corresponded'. Templates are thus about the management of syntagmatic space in languages where quantity distinctions (short vs. long segments) count more than quality distinctions. They are viewed as fully-fledged morphemes, which may consist of any string of C and V positions ordered in a fixed way so that they convey specific grammatical information.

In order to reduce the number of templates proposed by McCarthy (1981: 396), Guerssel & Lowenstamm (1990) and Lowenstamm (2003) suggest that the verbal forms of Classical Arabic are derived by means of a single template, composed of four CV units, one of which is an empty site that may host various operations, including consonant gemination and vowel-lengthening.[10] This is illustrated in (10).

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[10] The idea of reducing the number of templates in the verbal conjugation of Classical Arabic is not new. McCarthy (1979: 135) has already suggested expressing the regularities that the verbal forms and their canonical patterns show by means of two templates: CV((CV)[+seg])CVC and CCV([+seg])CVC. The first template abbreviates the
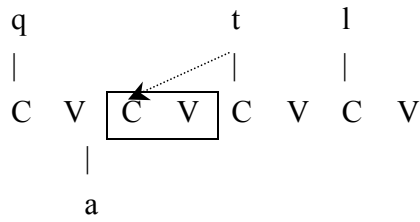
(10) a. *qattal*   b. *qa:tal*
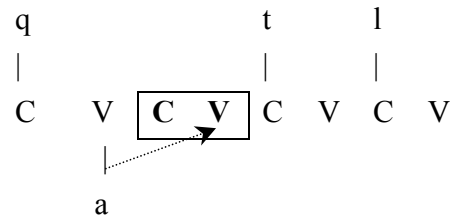
The boxed CV is viewed as a morphological head whose only specification is being derivational. The identification of one of its positions by some affix or root material derives one verbal form. For example, given the triconsonantal root *qtl* 'kill', if the derivational site is filled by means of C-spreading, the resulting verb will be *qattal 'he massacred* (intensive)*'* (10a), whereas its identification by means of V-spreading leads to the form *qa:tal* 'he fought (reciprocal)' (10b).[11] If none of its positions is identified, the output is *qatal* 'he killed', which stands for the basic form of the verb, also called Form I in standard analyses. Although semantically viable, the intensive reciprocal **qa:ttala* is ruled out because it involves the identification of both C and V positions at the same time.

In line with the above proposal, we can posit that diminutives in MA are formed by means of a specific template, whose antepenultimate CV unit acts as a derivational head.[12] Singular diminutives in (4) can be derived by means of a fixed shape template, whose antepenultimate CV hosts the diminutive marker. This marker is argued to be a high front unrounded vowel /i/, which connects to two V positions, as shown in (11).

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patterns CVCVC, CVCCVC, CVVCVC, CVCVCCVC and CVCVVCVC. The second abbreviates the patterns CCVCVC, CCVCCVC and CCVVCVC.

[11] It is worth noting that no single semantic feature is associated with the derivational CV: verbs using medial-consonant gemination may be intensive, causative or just transitive, while those with a long vowel are not always reciprocal (e.g. *sa:fara* 'he travelled', *dˤa:ʕafa* 'he doubled').

[12] In this respect, it is interesting to note that nouns differ from verbs in that the latter use internal morphology between the first two root consonants, while nouns generally resort to infixation between the last two consonants (e.g. *kita:b* 'book', *rima:l* 'sands')

(11) *a.*   DIM FM SG: *bliɣa*   *b.*   DIM MS SG: *wlijjəd*

```
       b    l         ɣ                    w    l         j    d
       |    |         |                    |    |         |    |
   C   V  C  V │C V│ C  V C  V         C   V  C  V │C V│ C  V C  V
               \ /        \ /                       \ /       |
                i          a                         i        ə
```

As can be seen from these representations, the template consists of five CV units, three of which accommodate the root consonants, while the others host long vowels and epenthetic elements. The derivational boxed CV allows the diminutive marker /i/ to connect to two V positions. However, in (11b), the diminutive marker ends up in contact with the following syllable, whose nucleus surfaces as schwa since properly ungoverned. The resulting hiatus is then resolved by *j*-epenthesis, leading to the form *wlijjəd*. The geminated [jj] could be a mere phonetic by-product of the co-articulation of a high vowel followed by a glide j or the result of an off-gliding [iʲ] that anticipates the realization of the next sound, which is a glide itself.[13]

Interestingly, the addition of the plural suffix −*at* to a form like *wlijjəd*, leads not only to the vocalic position preceding the last root consonant remaining empty (since properly governed by the vowel /a/), but also to the degemination of the glide, leading to *wlijdat*. This process suggests that there is a causal relationship between the presence of schwa and the gemination of the glide.

As to the forms in (4d-e) like *kʷtijjəb* 'little book' and *bbʷijjət* 'small room', these show a labio-velarized initial consonant. This labio-velarization can be seen as a remnant of the vowel *u* found in CA diminutives such as *kulajb* 'little dog'. In line with the proposal put forth in (7), this short vowel remains silent in MA unless it is adjacent to a labial or velar consonant, which allows it to surface as a round feature.

Biconsonantal forms further support the templatic effect since they geminate the initial consonant or use a glide in order to fill the whole template used in the diminutive. This is shown in (12) with the diminutive forms of *dˁar* 'house' and *bit* 'room'.

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[13] This phenomenon is not limited to diminutives. It is also found in the plural formation (e.g. *ʒili* (sg) / *ʒilijjat* (pl) 'vest', *biru* (sg) / *biruwwat* (pl) 'office'). Further examples and discussion is found in Boudlal (2001: 280). It should be noted that in certain varieties of MA, the glide following the diminutive marker surfaces as non-geminated. The reader is referred to Elmdari (1999: 82) about the MA variety of Marrakech.

(12) *a.*   DIM FM SG: *dwira*   *b.*   DIM MS SG: *bbʷijjət*

```
    d     w         r                          bʷ          j      t
    |     |         |                          / \         |      |
  C V C V C V C V C V                        C V C V C V C V C V
        \ /   \ /                                  \ /     |
         i     a                                    i      ə
```

Quadriconsonantals (4f) behave similarly to the other forms, except that their template involves four basic CV units accommodating the root consonants, while the diminutive markers require two additional CVs. The second vowel can be viewed as a mere copy of the diminutive marker which appears between the last two consonants, exactly where a full vowel is found in the singular form. This behaviour is illustrated in (13) using the form *sərwal* 'pants' and its diminutive *sriwil*.

(13)

a.   MS SG: *sərwal*

```
        s     r     w         l
        |     |     |         |
        C V C V C V C V C V
          |           \ /
          ə            a
```

b.   DIM MS SG: *sriwil*

```
        s     r           w         l
        |     |           |         |
        C V C V C V C V C V C V
              \ /     \ /
               i       i
```

As we can see from these representations, the template of the diminutive (13b) is just the template of the masculine singular (13a) plus one CV unit which accommodates the diminutive marker /i/. The copy of this marker, viewed as a kind of harmony, appears exactly where the vowel /a/ is found in the basic form. This suggests a kind of prosodic transfer between the base and the diminutive. It is worth adding that triconsonantals containing a geminate behave in the same way as genuine quadriconsonantals as their diminutives involve double infixation of the vowel /i/ between the last three consonantal slots, two of which host a geminate. Thus for

15

instance, masculine singular *səllum* 'ladder' and *bərrad* 'tea pot' form their diminutive as *slilim* and *bririd* (see Boudlal 2001: 250 for further examples). This is readily accounted for by analysing the medial geminate as a single melodic unit associated to two C slots, making the base template quadriconsonantal.

In the next subsection, we turn to the central question of this section, namely why diminutives select for external plurals rather than internal ones.

2.3.4 Templatic competition

It is quite puzzling why the diminutive and non-diminutive forms of the same noun do not use the same plural formation. Why does the non-diminutive *bəlɣa* 'slipper' (4a) have an internal plural *blaɣi*, while its diminutive *bliɣa* 'little slipper' uses the suffix –*at* in the plural? Similarly, why does *wəld* 'boy' lead to plural *wlad* whereas *wlijjəd* 'little boy' forms it plural as *wlijdat*? The answer to these questions comes naturally if we assume that the diminutive and the internal plural markers compete for the same templatic position, namely the internal derivational CV. The diminutive forms *bliɣa* (14a) and *wlijjəd* (14b) along with their non-diminutive plurals *blaɣi* (14c) and *wlad* (14d) illustrate this templatic competition.

(14) *a.*   DIM FM SG: *bliɣa*   *b.*   DIM MS SG: *wlijjəd*

```
        b    l        ɣ                    w    l        j    d
        |    |        |                    |    |        |    |
        C V C V [C V] C V C V              C V C V [C V] C V C V
                 \ /   \ /                          \ /   |
                  i     a                            i    ə
```

c.   FM PL: *blaɣi*   *d.*   MS PL: *wlad*

```
        b    l        ɣ                    w    l        d
        |    |        |                    |    |        |
        C V C V [C V] C V C V              C V C V [C V] C V
                 \ /   \ /                          \ /
                  a     i                            a
```

The vowel /a/ in *blaɣi* and *wlad* is a plural marker. It occurs exactly where the diminutive marker appears in the forms in (14a,b), namely between the last two radicals, attaching to two V

slots, one of which belongs to the derivational (boxed) CV. When the diminutive marker is realized, no vocalic position is left for the association of the plural marker. Therefore, the only option for diminutives to form their plural is to use the suffix –*at*, leading to *bliɣat* and *wlijdat*. Competition therefore holds for a pre-specified position in the template, viz. the internal derivational CV, rather than for the whole template. As stated earlier in section 2.3.3, this internal CV acts as a morphological head in the sense of Lowenstamm & Guerssel (1990) and Lowenstamm (2003). Its identification by some phonological material derives one form. In the case at hand, it hosts either the diminutive or the internal plural marker, never both at the same time. A question one may ask is: why does the diminutive marker take precedence over the plural marker? Why is the diminutive formed before the internal plural?

In an attempt to implement our templatic analysis to a syntactic structure, we could argue that diminutive nouns, just as internal plurals, are projected within the domain of nP, the head of which has plural and diminutive features. Given that the diminutive can be formed only under *n* while the plural has two dedicated positions, one under *n* and the other under *num*, the diminutive is generated first, before the plural is formed higher in the structure by means of –*at* suffixation. Another possibility is to assume that diminutives are derived lower in the structure than internal plurals, heading their own projection between the root and the head of nP. This proposal is not new; the reader is referred to De Belder *et al.* (2015) for a similar proposal used to distinguish inflexional diminutives from lexical ones in Hebrew and Italian. However, MA has no such lexical and inflexional distinction in diminutives. An alternative analysis is found in Lampitelli (2010: 208) who argues that all diminutives in Italian are formed under DimP (i.e. Diminutive Phrase), lower in the structure than nP. In line with this proposal, we claim that the derivational CV is the locus of phonological exponents of one or more syntactic terminals. It is generated under the projection immediately above the root, namely DimP. This derivational CV allows the diminutive marker /i/ to surface. When raised to the head of nP, it has no more V position available for the realization of the internal plural marker, leaving –*at* suffixation as the only strategy for pluralization.[14] The diminutive form *bliɣat* illustrates the proposal in (15).

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[14] As stated earlier in section 1, MA does show a few double plurals, such as *mwasat* 'knives' (plural of plural *mwas*) and *qwasat* 'arches' (plural of plural *qwas*). This supports our assumption that both nP and numP are the locus of plurality in MA.

(15)
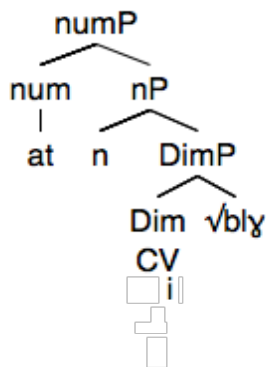
Following the hypothesis that the order of the affixes directly reflects the order of application of the morphosyntactic operations (cf. Baker's Mirror Principle, 1985) and that their position within the word mirrors their position in grammar (Scalise 1988: 235), the diminutive appears lower in the structure than the plural. Furthermore, the absence of the internal plural marker in diminutives is viewed as by-product of the templatic character of MA morphology. The internal derivational CV determines the distribution of grammatical markers, allowing the internal plural marker to surface only when the diminutive marker is absent.

Evidence for the linear order in which the diminutive precedes the plural is found in many other languages such as French *char-ette$_{DIM}$-s*$_{PL}$ 'carts', *ois-illon-s* 'chicks', Italian *ros-in$_{DIM}$-e$_{PL}$* 'little roses', *poet-in-i* 'little poets', English *book-let$_{DIM}$-s$_{PL}$, circl-et-s, cat-kin-s*, Dutch *tafel-tje$_{DIM}$-s$_{PL}$* 'small tables', *huis-je-s* 'small houses' (Booij 2002), and Bulgarian *palt-ents$_{DIM}$-a$_{PL}$* 'little coats' (Milenova 2009: 134). In contrast, certain forms in Yiddish exhibit an internal plural marker followed by the diminutive, but they all end with an external plural marker such as in xavejrəmləx (⟵ xavejr-əm$_{PL}$-l$_{DIM}$-əx$_{PL}$) 'the little friends' (Lowenstamm 2008).[15]

Further arguments for the lower position of diminutives are morphological and semantic. Morphologically speaking, we note that the diminutive forms in MA exhibit morphological irregularities. The allomorphic variation that their markers display does not only follow from templatic constraints, as we have shown above, but is also conditioned by gender features. That is, diminutive markers select bases of one gender value (masculine or feminine) and their formations preserve this value: The marker *-ijj-,* as in *wlijjəd* (⟵ wəld 'boy'), selects only

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[15] Perlmutter (1988) analyzed the internal plural marker *-əm* as part of suppletive forms, lexically specified as such. Alternatives to this approach are proposed in Lowenstamm (2008) and Newell (2008).

masculine bases, while *i-a,* as in *bnita* (← *bənt* 'girl'), selects feminine ones. No such property is found with internal plural markers whatever their surface form is. For example, the infix *-wa-* is compatible with feminine (e.g. *gamila*~SG~ / *gwaml*~PL~ 'bowl') and masculine bases as well (e.g. *ħanut*~SG~ / *ħwant*~PL~ 'room'). The reader is referred to Milenova (2009) for a similar argument in Bulgarian diminutives.

From a semantic perspective, MA diminutives refer not only to smallness but also to affection and tenderness, and can also have a pejorative connotation. Such polysemy is absent in plurals, except for collective readings associated with internal plurals.

The lower location of the diminutives in MA, closer to the root, accounts for these morphological and semantic properties.[16] Similar arguments have been proposed in the analysis of diminutives in Modern Greek (Melissaropoulo & Ralli 2008) and Bungarian as well (Milenova 2009).

We now turn back to the analysis advocated in section 1. External evidence for the hypothesis that broken and sound plurals reside in distinct syntactic positions is drawn from emphasis spread. We argue that emphasis spreads within the domain of nP.

3. **Emphasis spread**

3.1. MA emphatic consonants

The coronals *t^ʕ, d^ʕ, s^ʕ, z^ʕ* and *r^ʕ* are the uncontroversial emphatics (pharyngealized) in MA as well as in many other Arabic varieties (see Benhallam 1980, Ghazali 1981, Younes 1993, Davis 1995, Zeroual 2000, Kenstowicz and Louriz 2009). There are important acoustic and articulatory differences between pharyngealized coronals and their plain counterparts, which result in clear auditory differences between items containing emphatic consonants and items containing plain ones. The acoustic differences are observed in terms of VOT durations for voiceless stops (the emphatic /t^ʕ/, for instance, has a shorter VOT duration compared to its plain counterpart), and most importantly in terms of qualitative effects on adjacent vowels (see below). The articulatory differences are observed both at the supralaryngeal and laryngeal levels. At the supralaryngeal level, the emphatic coronals are produced with a backward movement of the tongue towards the

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[16] For a thorough analysis of morpho-phonological and semantic irregularities within the domain of category-defining projections, close to the root, the reader is referred to Marantz (2013). See also Arad (2003) about the interpretation of roots in Hebrew.

posterior pharyngeal wall, while the anterior part of the tongue is substantially lowered. At the laryngeal level, voiceless emphatics have a smaller glottal opening, compared to their plain counterparts. The small glottal opening of /tˤ/ is the most likely reason for the shorter VOT displayed by this segment.

At the surface level, emphasis is a property which can spread to any segment. For instance, in *tˤəbbaχ* 'cook', which contains only one underlying emphatic segment /tˤ/, all the segments contained in the word are pharyngealized. The exact delimitation of the propagation of this feature is a source of much controversy. It is generally considered that the minimal and maximal domains of this propagation are the syllable and the word, respectively. According to Kenstowicz and Louriz (2009: 45): "*Emphasis can spread in both directions and dialects differ as to which segments if any block (or minimize) the propagation. In MA the process is restricted to the stem and does not affect inflectional suffixes except that a CV sequence must be realized uniformly as plain or emphatic*".

Owing to frequent uncertainties in acceptability judgments, we have conducted an acoustic study to assess and establish the facts about emphasis spread in MA on experimental grounds. The acoustic data were recorded from three subjects producing thirty items with emphatic consonants in broken and internal plurals, as well as a set of minimal pairs contrasting emphatic to plain consonants.

3.2. *Plural formation and emphasis spread: acoustic data*

3.2.1. Emphasis effect on vowels

In all dialects of Arabic that have been acoustically investigated, pharyngealization is consistently manifested by a lowering of the second formant (F2) of the vowel following the emphatic consonant. This pattern has been observed in Egyptian Arabic (Wahba 1993), Lebanese Arabic (Obrecht 1968), Jordanian Arabic (Khattab et al. 2006), and Tunisian Arabic (Ghazeli 1981). The same pattern has been observed in MA based on our data, as figure 1 shows (see also Zeroual 2000 and Shoul 2007).
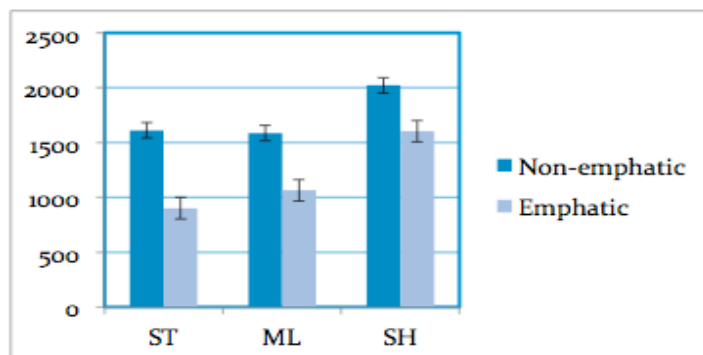
20

Figure 1. F2 values (in Hz) showing the effect of emphasis on the following /a/ vowel for three subjects (ST, ML and SH).

The significant F2 drop after emphatic consonants can be attributed not only to their pharyngeal constriction, but also to the "*simultaneous depression of the palatine dorsum*" (Ali and Daniloff 1972: 100) compared to their non-emphatic cognates. The pharyngeal articulation during MA emphatics does not seem to be narrow enough to induce substantial raising of F1 (Zeroual et al. 2007).

Before addressing the question of how far emphatic consonants spread their feature in broken and sound plurals, we provide some background on phase theory and its implications for phonological derivation. This proves necessary to the understanding of our analysis, in particular the domain within which emphasis spreads.

3.2.2. On phonological derivation by phase

Recent studies have argued for a model of grammar in which pre-specified chunks of syntactic structure are sent to the phonological and semantic components, relying on Chomsky's (2001, 2008) proposal that syntactic derivations proceed by phase. This line of research has lead to a new movement in phonological theory, initiated by Marvin's (2002) fundamental work, which attempts to combine insights from early Lexical Phonology (Kiparsky 1982, 1985, Mohanan 1982, Rubach 1985) with Distributed Morphology (Halle and Marantz 1993, Marantz 1997) in order to account for non-automatic phonological processes that standard approaches fail to address in a satisfactory manner.

Generalizing from little vP (Chomsky 2001), Marantz (2001, 2007) argues that any category-forming projection, including nP, vP and aP, uniformly defines a phase that locally determines the phonological and semantic properties of words. From a phonological perspective,

derivation by phase allows an explanation for certain phenomena confined to specific domains, suggesting that the whole material within a phase is spelled-out before any other operation is performed. In line with this proposal, Marvin (2002: 34) addressed among other things the opacity characterizing schwa-insertion in English *meter* [miːtər], *metric* [mɛtrik] and *metering* [miːtəriŋ]. According to the author, the reason that the vowel-initial suffix prevents schwa from appearing in *metric* as opposed *metering* lies in the fact that the adjectival suffix *-ic* is spelled-out in the same phase as /metr/, whereas the gerund marker *-ing* is added later in the syntactic structure, once *meter* is spelled-out along with its schwa. The *Phase Impenetrability Condition* (Chomsky 2001) is mobilized to explain why a previously-inserted schwa is not deleted. The same reasoning holds for the role of affixes in stress-assignment, Marvin argues.

Several studies have since generalized derivation-by-phase to phonological opacity in various languages, including Ojibwe (Pigott & Newell 2014), Basque (Samuels 2010) and Berber (Lahrouchi 2013). The common denominator of these studies is that category-defining projections qualify as phases, which locally determine the domain of certain phonological processes.

One can still argue that derivation-by-phase is but a mere restatement of early phonological cycles (cf. Mascaró 1973, Kiparsky 1982, 1985, Mohanan 1982, Rubach 1985, among others), which proved useful to account for various types of phonological opacity including the aforementioned. However, while phases are morpho-syntactic domains, motivated outside the realm of phonology, phonological cycles may appear as *ad hoc* stipulations which lack any external evidence. That is to say, one can add as many cycles as needed to explain a given phonological phenomenon, whereas phases are morpho-syntactically constrained, none of which can be affected by phonology. Economy considerations further allow any spelled-out chunk to become impenetrable for following operations, thus leading to a grammar whose computation is much simpler in terms of memory load and processing.

In the next subsection, we return to emphasis spread in MA. We argue that phasal spell-out better explains why the broken plurals are entirely pharyngealized while the sound plurals are affected only partially.

3.2.3. *nP as the domain of emphasis spread*

From our perspective, the projections of category-forming heads, including nP, are the maximal domain of emphasis spread in MA. According to this view, broken plurals containing an emphatic consonant will be entirely pharyngealized, while sound plurals will be affected only partially. That is to say, nP demarcates a phase, wherein the broken plural is spelled out and is hence sensitive to emphasis spread. For instance, both *sˤəbbat* 'shoe' and *sˤbabt* 'shoes, IP' will be entirely emphatic. If we consider *tˤəbbaχa* 'cooks, IP' and *tˤəbbaχat* 'cooks, EP', however, the suffix –*at* along with the onset consonant χ are expected to remain unaffected by pharyngealization. We tested this through the analysis of the 2nd formant of the vowel /a/ in a series of triplets with internal and external plurals. Two such triplets are shown in (16), where the compared /a/'s are bolded and underlined.

(16) /tˤəsˤwer**a**/　　　　"photo"

　　　/tˤsˤawər/　　　　　"photos, IP "

　　　/tˤəsˤwer**a**t/　　　"photos, EP"

　　　/tˤəbbaχ/　　　　　"cook"

　　　/tˤəbbaχ**a**/　　　　"cook, IP"

　　　/tˤəbbaχ**a**t/　　　　"cook, EP"

Our results show a difference in F2 values of the two /a/ vowels. The vowel affected by emphasis displays, as expected, a lower F2 suggesting a more posterior realization characteristic of a dorso-pharyngealized production. This pattern, illustrated in figure 2, is observed for internal plural /a/ but not for the /a/ of the suffix –*at*. The differences between the two *a*'s are rather easy to perceive even for non-native speakers. The final /a/ of /tˤəbbaχ**a**/, for instance, sounds more like [ɑ], whereas the /a/ of /tˤəbbaχ**a**t/ is close to [æ].
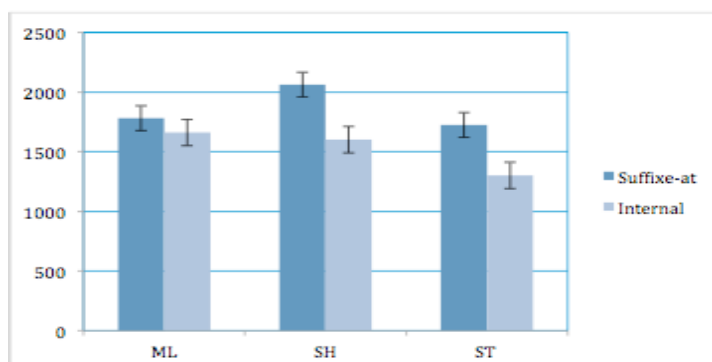
Figure 2. F2 values (in Hz) showing the spread of emphasis on the internal /a/ vowel as opposed to the plain /a/ of the suffix -at.

Although both a's appear exactly in the same position with regard to base form, immediately following the final root consonant, their behaviour toward emphasis shows that they belong to different domains. That is to say, the broken plural -a as in *tˤəbbaχ**a*** is spelled out within the nP phase and is hence pharyngealized, while the sound plural suffix -*at* lies outside the phase, preventing its vowel from being pharyngealized. The same reasoning holds for the feminine marker -*a* in *tˤəsˤwer**a***. Based on the assumption that gender is generated within the nP, as a feature under *n* (see Ritter 1993 and Lowenstamm 2008, among others), we naturally expect its phonological exponent to undergo pharyngealization just as in the broken plurals. Without such an interface approach, one can hardly understand why the same vowel in the same linear position behaves differently with respect to emphasis spread. Although diminutives have not been tested, we expect them to behave in the same manner with respect to emphasis spread—their singular forms entirely emphaticized since they are formed within the domain of nP, while their plurals are affected only partially (e.g. /sˤbijjəʕ/ 'small finger' is realized as [sˤbejjəʕ] with its diminutive marker /i/ lowered to [e] since pharyngealized. However, in the corresponding plural [sˤbejjəʕat] 'small fingers', the suffix –*at* resists pharyngealization because it lies outside the nP).[17]

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[17] Further evidence for the phase-hood character of category-determining projections in MA comes from glide-vowel alternations. Like Berber (see Guerssel 1986, Lahrouchi 2013), MA has many instances of glide-vowel alternations which call for an analysis in terms of phasal derivation. Compare, for instance, *xu* 'brother' to *xwatat* 'sisters'. The high vowel in the first form turns into a glide since it is immediately followed by the vowel -*a*. This alternation is automatic within a single domain, namely nP. However, in certain cases the same vowel remains unchanged as in *xu-ja* 'my brother', while the possessive clitic turns its vowel –*i* into [j] in order to avoid hiatus. The reason that the high vowel *u* alternates with the glide *w* in *xu* / *xwatat* but not in *xu* / *xu-ja* can easily be explained if we assume that the alternation is automatic within the nP phase. In *xu-ja*, the segments following /u/, including the possessive clitic -*i*(a), have no access to the phonological material already spelled-out .

4. Conclusion

In this study, we have argued that internal (broken) and external (sound) plurals are located in distinct syntactic positions, namely nP for internal and NumP for external plurals. This analysis provides a principled way of capturing the morphological and semantic differences that internal and external plurals display. We have also provided a templatic account for the formation of diminutives. We have argued that the diminutive and internal plural markers compete for the same templatic position, forcing the diminutives to form their plural by means of suffixation. In an attempt to implement our templatic analysis to a syntactic structure, we have argued that diminutives are derived lower in the structure than internal plurals, heading their own projection between the root and the head of nP. This allows us to explain why the diminutive marker takes precedence over the internal plural marker, forcing all diminutive forms to undergo external plural formation. Emphasis spread was used as evidence in support of the hypothesis that internal and external plurals reside in distinct syntactic positions. Based on acoustic data from three subjects, nP has been shown to be the domain of emphasis spread, evidenced from the F2 lowering characteristic of dorso-pharyngealization, observed in internal but not in external plurals.

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