DOMINANCE-AS-MARKEDNESS: EVIDENCE FROM BARI[*]

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This paper examines a formal consequence of the assumption that dominance is equivalent to markedness (Casali 2016): if dominant ATR values are marked and therefore specified, while recessive values are unmarked and unspecified, then no phonological process in a language with ATR dominance should require reference to the recessive value. This claim is examined in light of new data and analyses of ATR harmony and three other vowel assimilation patterns in Bari (Eastern Nilotic; BFA). I demonstrate that all four of these processes are analyzable without reference to the recessive value of ATR, supporting the characterization of dominance as markedness, and markedness as specification.

Keywords: ATR, markedness, dominant-recessive harmony, assimilation, Eastern Nilotic, Bari

1. Introduction

The correct descriptive and formal characterization of ATR dominance has been a longstanding unresolved question in African linguistics (and more generally). Casali 2016 proposes a treatment of dominance as markedness; doing so, he argues, provides an explanation for the cross-linguistic differences in behavior across languages with ATR distinctions reported in earlier work (Casali 2003, 2008). Markedness here is representationally encoded as full specification of the dominant feature value over lack of specification of the recessive feature value.

This claim, which I refer to here as the *dominance-as-markedness hypothesis,* makes a prediction which is touched upon briefly in Casali 2016, but not fully explored: if dominance is equivalent to having only one specified, "active" value for ATR, then in a language with a dominant-recessive ATR system, there should exist no phonological process in that language which crucially relies on the recessive value. Put more simply, no phonological process should ever be able to refer to the recessive value of ATR, *regardless* of what type of process it is.

In this paper, I examine the dominance-as-markedness hypothesis with respect to four patterns of vowel assimilation in Bari (Eastern Nilotic, BFA), based on elicited data from a native speaker. These assimilatory processes are:

(1)   ATR-dependent processes in Bari
   a.   [+ATR]-dominant harmony
   b.   Limited height harmony in [+ATR] roots

    c.   Raising and backing of low vowels in suffixes
    d.   Raising and fronting of root low vowels triggered by suffixal /-i/

       I demonstrate that analysis of each of these four processes requires reference to ATR, and that in none of these cases is it ever necessary to make reference to the recessive value. Furthermore, I show that the patterns exhibited in this language capture critical generalizations that corroborate intuitions about the relative markedness of the dominant feature.

       In the remainder of the introduction, I will discuss the details of Casali's conception of dominance in more detail. Section 2 covers necessary background of this study, including a discussion of the means by which data were collected, the phonemic vowel inventory, and a preliminary sketch of relevant morphology. Section 3 discusses in detail the four processes from (1). Section 4**Error! Reference source not found.** concludes the paper and identifies future directions for the work.

**1.1 Casali's View of Dominance** ATR harmony systems are typically described as either dominant-recessive or stem-controlled. *Stem control* describes a harmony system where the ATR values of all vowels in a word are determined by the value of the stem vowels. Under a stem-controlled harmony system, either value of a feature can spread. This is distinguished from *dominant-recessive* harmony, in which only one "dominant" value of ATR is active. The defining characteristic of a dominant-recessive system has historically been a pattern in which dominant vowels outside of the root (especially suffixes) can force agreement within the root.

       This pattern, which is referred to as assimilatory ATR dominance in Casali 2003 and subsequence work, almost exclusively occurs in languages in which [+ATR] is the dominant value. The apparent lack of [-ATR]-dominant harmony patterns, as well as the (arguably) antagonistic gestures involved in the production of certain sounds in ATR systems (e.g. [+ATR, +low]) has historically led some researchers to claim that [-ATR] is universally marked (Archangeli & Pulleyblank 1994; Calabrese 1995; Leitch 1996), and that only [+ATR] can be dominant (Baković 2000).

       Casali (2003) presents results from a typological survey that suggest that dominance goes beyond instances of productive ATR harmony; instead, Casali proposes, dominance is a much larger phenomenon encapsulating *all* scenarios where a language prefers to preserve or otherwise make reference to one value of ATR over another. This expansion of dominance opens the door for nearly any language with an ATR distinction to be considered a dominant-recessive system, regardless of the presence or absence of harmony, and including apparent instances of [-ATR] dominance.[1]

       These claims are further supported by a proposal that the type of ATR dominance displayed by a language is dependent on that language's phonemic vowel inventory (Casali 2008). ATR languages typically have between 7 and 10 contrastive vowel qualities; the four most common vowel systems are schematized below:

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[1] I will not delve into the many proposed instantiations of dominance here, as full details are available in Casali 2003. However, one relevant pattern discussed at some length is the relationship between coalescence and dominance. In a language which has both dominance and coalescence, ATR-disagreeing vowels will preserve the dominant value. For example, in a [+ATR]-dominant language, the result of coalescing a sequence /a+i/ will be [e] (even if that language contains /ɛ/), while a [-ATR]-dominant language will instead result in [ɛ].

(2) Typical ATR inventories (adapted from Casali 2016)

10V   **9V**

i   u   i   u

  ɪ   ʊ   ɪ   ʊ

   e   o   e   o

    ɛ   ɔ   ɛ   ɔ

    ạ   a

    a

7V-1   **7V-2**

i   u   i   u

  ɪ   ʊ   e   o

   ɛ   ɔ   ɛ   ɔ

    a   a
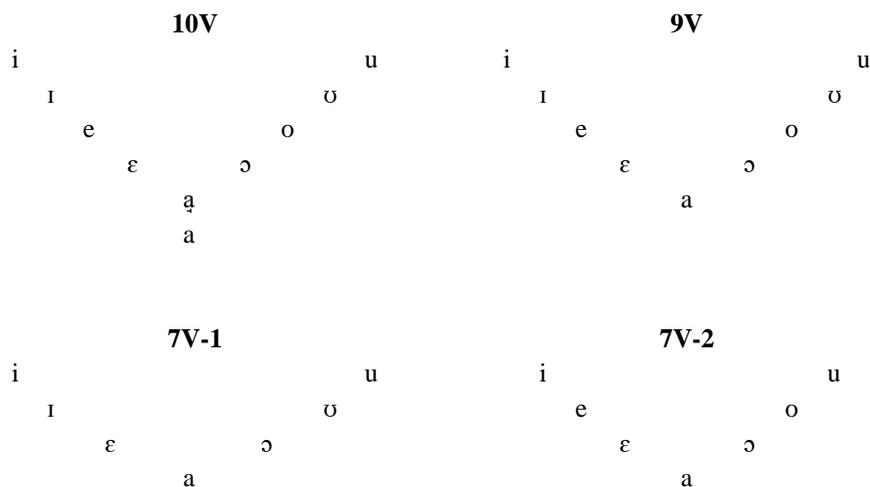
The critical takeaway here is that, in addition to the general lack of a [+ATR] low vowel, languages with seven vowels or fewer are most likely to be missing an ATR contrast in either high or mid vowels. Casali shows that there is a strong tendency for languages which maintain an ATR distinction in high vowels (referred to as *2IU languages*) to display [+ATR] dominance, while languages lacking this distinction (*1IU languages*) tend to be [-ATR] dominant. An important consequence of this proposal is that nine- or ten-vowel languages, which appear to universally retain an ATR distinction in high vowels, will by default be [+ATR]-dominant.

The dominance-as-markedness proposal from Casali 2016 explores this proposal in terms of markedness, treating dominant features as marked and recessive features as unmarked. These arguments are primarily supported by the fact that even in languages with productive ATR harmony, dominant-recessive languages typically positionally neutralize to the unmarked feature value. This falls in line with a traditional view of markedness that assumes that languages prefer to *reduce* markedness via neutralization (Truzbetzkoy 1939; Beckman 1997; Steriade 1995; Rice 2007, and others). However, dominant-recessive harmony itself appears to be an attempt to *maximize* marked feature values, which contradicts this assumption. Casali explains this by adopting the notion of *preservation of the marked* from de Lacy 2006; as such, the cross-linguistic variation in dominance patterns (including harmony) can be explained as a relationship between competing pressures of both reduction and preservation.[2]

Casali attempts to capture these generalizations representationally by proposing that markedness is equivalent to specification; that is, the dominant value is marked and fully specified, while the recessive value is unspecified. As such, languages with dominance patterns make an underlying distinction between fully specified marked segments and unspecified, unmarked segments.[3]

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[2] It is worth noting that only the claim from de Lacy 2006 regarding the push-pull relationship between preservation and neutralization of marked features that is adopted by Casali; see section 4 for some discussion of this point.

[3] How the surface distinction arises is not discussed; presumably the recessive value is filled in at a later stage if no dominant value is gained.

Neither the formal implications (nor the full formal implementation) of these claims are fully elaborated upon in Casali 2016, though the possibility of many potential technical and theoretical issues is acknowledged. It is not my intention to solve all these issues here. Instead, I will be taking at face value the representational aspect of the dominance-as-markedness hypothesis, and examining whether (and to what degree) it is supported by the patterns displayed in Bari.

2. Language Background

In this section, I briefly outline the language background of Bari and the project in which this data was collected. I also discuss some aspects of the acoustics of Bari vowels, as well as aspects of number marking morphology—both of these are relevant to the assimilatory processes which are of primary interest.

2.1 Background, methods & speakers Bari is spoken by roughly 655,000 people, mostly Residing in South Sudan (Lewis et al 2016). Bari has several dialects, including Bari itself (the dialect referenced in this paper, and the prestige dialect), Kuku, Nyepo, Ligo, Nyangbara, and Pöjulu. Closely related languages are Mundari and Kakwa.[4]

Bari is relatively well-described, though there are significant gaps between early descriptions (Spagnolo 1933, 1960) and later work (Hall & Yokwe 1981, Yokwe 1978, 1987). The most recent work is Yokwe's 1987 dissertation, which focuses primarily on tone, with less emphasis on harmony and segmental phonology. The tonal system described in Yokwe 1987 and that of my speaker are more or less the same, but previous descriptions of harmony and segmental processes are not fully corroborated by the data I have collected.

The data referenced in this paper were collected in San Diego, CA in 2014 and 2015. My primary consultant, Mrs. Najua Loro, is a South Sudanese immigrant. She was born and grew up in a village called Tombur, which is located in Juba, in the Central Equatorial State of South Sudan. Mrs. Loro speaks the Bari dialect of Bari, but is married to a man who speaks the Pöjulu dialect. She also indicated that she was familiar with several other dialects and Bari group languages, including Nyangbara, Kuku and Mundari, though it was not clear that she could actually speak them.[5] Mrs. Loro was primarily educated in Arabic and English, and showed limited proficiency in written Bari. For the sake of clarity, data in this paper will be presented in IPA.

2.2 Vowel Inventory Bari has a fully symmetric ATR system, with ten contrastive vowel qualities, illustrated below in (3).

(3) Bari contrastive vowel qualities

	[+ATR] [6]		[-ATR]	
High	i	u	ɪ	ʊ
Mid	e o		ɛ ɔ	
Low	ə		a	

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[4] The line between "dialect" and "language" for the Bari group is unclear and highly political. For example, Kuku has been described as a separate language, despite a high degree of mutual intelligibility (Cohen 2000). Meanwhile, my consultant has referred to Mundari as a dialect of Bari, despite there being very little intelligibility between the two.

[5] There was only one obvious case of dialectal interference, which is that Mrs. Loro at one point gave an alternate plural *múré:kì* 'dik diks' for *múrí* 'dik dik.' When questioned, she specified that this form was Kuku, not Bari.

[6] I am using '+' and '-' here as a shorthand for something like [ATR] and [RTR]; this is following Casali's style, and is not intended as a firm stance regarding the correct representation of tongue root features in Bari (or any other language).

Impressionistically, the [+ATR] vowels tend to sound "breathier" or "hollower," and [+ATR] round vowels are often produced with relatively more lip rounding. The primary acoustic cue between ATR harmonic pairs is F1. The F1 of [+ATR] vowels is 50-100Hz lower on average than their [-ATR] counterparts, which is consistent with other acoustic work on ATR (Guion et al 2004; Gick et al 2006; Starwalt 2008).

This F1 distinction is even more extreme when comparing the two low vowels (transcribed here as <a> and <ə>). Both vowels are central, but the average F1 of the [-ATR] low vowels are roughly 730Hz, while the average F1 of the [+ATR] low vowels are around 438Hz, making them closer to the [+ATR] mid vowels in terms of height. Similar height differences between [±ATR] low vowels have been reported in other Bari group languages such as Mundari (Stirtz 2014) and Kukú (Hall & Creider 1998; Cohen 2000), with Hall & Creider characterizing this degree of raising as a typological feature of the Bari group.

Despite the fact that [ə] is considerably higher than [a], it is still the case that [ə] patterns with [a] in the harmony system, and that processes that target or are triggered by [+ATR] mid vowels neither target nor are triggered by /ə/. Thus, we will assume that it is phonologically [+low]. In section 3.4, we will examine this assumption more closely in light of an exceptional fronting pattern.

In the foregoing discussion, recessive vowels will be represented orthographically as <I, U, E, O, A> in underlying representations. In surface forms, I will be using the symbols from (3).

2.3 Morphology All examples presented in this article involve number marking in nouns. The primary reason for this is that while ATR harmony is general in Bari, many of the assimilatory processes in the language appear to be explicitly tied to nominal forms. This may be an accident of morphology: Bari prefers to mark inflectional categories such as person, number, and tense either via periphrastic constructions or reduplication.[7]

Bari exhibits a rich tripartite number marking system, which is typical of Nilotic languages (Dimmendaal 2000). Nouns may be marked for the plural and unmarked in the singular ("plural-marked"); marked for the singular but not for the plural ("singular-marked"); or marked in both the singular and plural ("replacive" or "double-marked").

Most number marking strategies involve the concatenation of one or more suffixes with the noun root, though ablaut, tone change, ATR alternation, and suppletion are sometimes utilized instead or in tandem with a suffix. The majority of nouns are marked for the plural, and there are far more plural-marking strategies than singular-marking strategies. Some examples are given in (4); notice that (4) is an example of a noun marked with two suffixes.[8]

(4) Plural marking strategies
      a.   ŋédɛ́p-à (c.f. ŋɛ́dɛ́p 'tongue')
            tongue-PL
            'tongues'
      b.   ɓúrə̀n-ɟîn   (c.f. ɓúrə̀n 'cat')
            cat-PL
            'cats'
      c.   dìján-à-ɟîn   (c.f. dìján 'cat')
            famine-PL-PL
            'famines'

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[7] Bari has derivational morphology in verbs. However, verbal data collected as a part of this field project suggest that verbs undergo a more limited set of alternations, and this also appears to be the case in earlier descriptions of this language (e.g. Yokwe 1987).

[8] I will generally not be explaining apparent phonological alternations. The reader should assume that variation across surface forms of singular and plural forms of words are representative of productive phonological patterns unless otherwise noted.

Singular-marked nouns are typically (though not always) mass or count nouns, such as foodstuffs and herds of animals. Unlike the plural, there do not appear to be any instances of concatenation of multiple suffixes to form the singular:

(5) Singular marking strategies
      a. ŋédɛ́p-à (c.f. ŋédɛ́p 'tongue')
          tongue-PL
          'tongues'
      b. ɓúrə̀n-ɟîn   (c.f. ɓúrə̀n 'cat')
          cat-PL
          'cats'
      c. dìján-à-ɟîn   (c.f. dìján 'cat')
          famine-PL-PL
          'famines'

Replacive or "double-marked" nouns, as the name suggests, are marked for both the singular and the plural. There appear to be few semantic commonalities among replacive nouns, and these nouns are rarer in my data than either singular- or plural-marked nouns.

(6) Singular and plural marking
      a. súkúr-ì
          chicken-SG
          'chicken'
      b. sókór-ò
          chicken-PL
          'chickens'

Some nouns may exhibit two or more number marking strategies. In most cases, having multiple available strategies does not change the meaning of the word, as in (7a). However, there are instances of plural (7b) or singular (7c) markers being used to generate semantically related but distinct words:

(7) Multiple strategies
      a. wúrí-ə   wúrí-ə̀t
          pig-PL   pig-PL
          'pigs'   'pigs'
      b. jápáʔ   jápál-à
          moons   moon-PL
          'moons'   'seasons'
      c. síwə̀-tî   síwà   síwà-tát
          bee-SG   bees   bee-SG
          'honeybee'   'honeybees'   'honey'

3. Assimilatory Phonological Processes

In this section, I discuss in much more detail the four assimilatory processes of interest. Recall that in order for the dominance-as-markedness hypothesis to be supported, each of these processes should be capturable without reference to the recessive feature of ATR (in this case, [-ATR]).

3.1 ATR Harmony As previously discussed, Bari has a ten-vowel, 5x2 system, which makes distinctions based on height, backness, and ATR. Following Casali's classification system, Bari is 2IU and therefore is expected to be [+ATR]-dominant by default. Bari does indeed exhibit prototypical dominant-recessive harmony of exactly this type: [+ATR] vowels in either roots or suffixes spread [+ATR] to all vowels in the word.

Under the dominance-as-markedness hypothesis, Bari's status as 2IU and [+ATR]-dominant means that all instances of roots or suffixes which alternate for this feature must contain underlyingly unspecified vowels. Casali's (2016) proposal does not specify anything about how other features should be represented. As a starting point, we will assume that vowels are specified for other relevant features such as height and place, with the exception of the low vowels, which are unspecified for place. This distinguishes them from front and back vowels. However, in section 3.3, we will see that there is a reasonable argument to be made that back vowels are also unspecified for place.

Examples of root-to-suffix harmony are given in (8). Note that in instances of hiatus at root+suffix boundaries, an epenthetic off-glide optionally surfaces, such as in (8a).[9]

(8) Root-to-suffix alternations
a.	dílí+À	→	dílíʲə̀	'holes'
b.	lúɓíɓìŋ+Àn	→	lúɓíɓìŋə̂n	'wasp sps.'
c.	kídí+Àt	→	kídíʲə̀t	'wells'
d.	dìkə́rì+ɹIn	→	dìkə́rìɹîn	'drinking gourds'
e.	lə́rí+À	→	lə́ríʲə̀	'drums'

Harmony also operates in a leftward direction, with [+ATR] spreading from suffixes to unspecified root vowels, as illustrated in (9):

(9) ATR Harmony: suffix-to-root
a.	mÁŋgÀ+tì	→	mə́ŋgə̀tî	'mango'	*cf.* máŋgà	'mangoes'
b.	sÍwÀ+tì	→	síwə̀tî	'bee'	*cf.* síwà	'bees'
c.	kwÊn+tì	→	kwèntî	'bird'	*cf.* kwên	'birds'
d.	kÒkÒrÎ+tè	→	kòkòrítê	'root'	*cf.* kòkòrî	'roots'
e.	mÁrÚk+ì	→	mə́rúkî	'mushroom'	*cf.* márók	'mushrooms'

If a suffix containing an underlying recessive vowel is concatenated with a root containing recessive vowels, all vowels surface as [-ATR]:

(10) Surface [-ATR] (no harmony)
a.	ŋÉdÉp + À	→	ŋɛ́dɛ́pà	'chins'
b.	mÉkÒr + À	→	mɛ́kɔ̀rà	'water buffalos'
c.	kÍdÍ + Àt	→	kídíʲàt	'shoulders'
d.	ɗÁkÚl + Àn	→	ɗăkólàn	'wounds'
e.	kÀrÎ + ɹIn	→	kàrìɹín	'clans'
f.	kÓrÉ + It	→	kɔ́rêt	'scoop'
h.	sÚsÚkÙ + It	→	sɔ́sɔ́kɔ̀tìt	'bead'

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[9] Previous descriptions of Bari have claimed that the language has glide formation of prevocalic high vowels (Hall & Yokwe 1981; Yokwe 1987). However, my consultant did not display any evidence of productive glide formation in her idiolect, instead exhibiting variation between epenthetic glides and unrepaired vowel sequences.

Harmony does not apply in a domain greater than the stem (which here is defined as the root plus any suffixes). There is no evidence of [+ATR] spreading across words (11a,b). It is also the case that prefixes on nouns, whether productive or fossilized, do not appear to alternate, as in (11c).

(11) Domain restrictions on ATR harmony

a. kónɛ́ dí'kérì ̀ʲət   'these drinking gourds (fem)'
b. kɔ̀pɔ́ lúdùkə̀tjô   'new cup (masc)'
c. kà ʔə́lək   'visitors'

Given that there are no apparent instances of [-ATR] spreading in this language, we can assume that [+ATR] is the spreading feature, and it is unnecessary to specify it. (12):

(12) ATR Harmony

$$[_{rt}V \quad V \quad V$$

[+ATR]
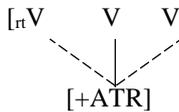
This rule states that vowels specified for [+ATR] spread that feature to surrounding vowels in the word. Restricting the domain of leftward spreading to the root accounts for the failure of prefixes to undergo ATR harmony. An important generalization to make here is that regressive harmony—that is, spreading from suffixes throughout the root—will result in a single [+ATR] feature with multiple links, as illustrated in (13) (tones omitted):

(13)   s I   w A + t i →   s i   w ə + t i

           [+ATR]   [+ATR]
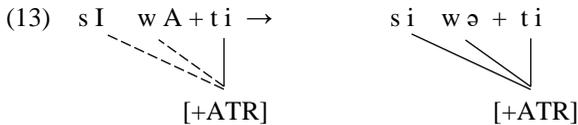
This is a formal consequence of the assumption that recessive vowels are unspecified. For roots containing dominant vowels—that is, roots which can trigger progressive ATR harmony—the choice between whether all vowels are specified for [+ATR] or not is somewhat less clear-cut. However, given that there is no evidence to the contrary, we will ultimately assume that all dominant vowels are fully specified in their underlying representation, and that for progressive ATR harmony, [+ATR] spreads from the root-final vowel.

3.2 Height harmony In addition to ATR harmony, Bari also exhibits a restricted form of height harmony which is exclusive to [+ATR] vowels. When a suffix containing a [+ATR] high vowel is concatenated with a root containing mid [+ATR] vowels (/e/ or /o/), the root vowels raise to their high counterparts ([i] or [u]). This is illustrated in (14).

(14) Height Harmony

a. lòwòró+ki   →   lùwùrûkì   'lakes'
b. ŋérépò+ti   →   ŋírípùtî   'anthill'
c. sómót+i   →   súmútî   'fish (sg.)'
d. délót+i   →   dílútî   'beaded necklace'
e. ɲòmôt+i   →   ɲùmútì   'seed'
f. tórók+i   →   túrúkî   'pebble'
g. lùmə́ŋgòrít+i   →   lùmə́ŋgùrítì   'stag beetle'

Roots with recessive mid vowels are subject to ATR harmony, but do not raise. This is illustrated in (15).

(15) No raising of unspecified mid vowels
a.	kÒrÓpÒ + ti	→	kòrópòtî, *kùrúpùtî	'leaf'
b.	kwÊn + ti	→	kwèntì, *kwìntí	'bird'
c.	tÉtÓn + ti	→	tétóntì, *títúntì	'young man'[10]
d.	kÈmÌrÛ + ki	→	kèmìrúkî, *kìmìrúkî	'sloths'

Height harmony is not triggered by suffixes containing recessive high vowels under any circumstances. In cases where these suffixes are attached to roots containing dominant vowels, the suffixes undergo harmony, but do not trigger raising, despite appearing on the surface as [+ATR] (16a-c). In cases where they are concatenated with roots that contain recessive vowels, height harmony still does not apply (16d-e).

(16) No raising by non-dominant suffixes
a.	tòré + ɹIn	→	tòréɹín	'flutes'
b.	kèlî + ɹIn	→	kèlíɹín	'songs'
c.	kítè + ɹIn	→	kìtéɹín	'tamarinds'
d.	tÈrÉrÈ + ɹIn	→	tèrérèɹín	'deserts; dry places'
e.	kÓpÒ + ɹIn	→	kópòɹìn	'cups'

Height harmony can be described as parasitic, in that it can only apply when target and trigger vowels agree for [+ATR] (Cole & Trigo 1988; Kaun 1995, 2004; Krämer 2003; Jurgec 2013). However, unlike more famous cases of parasitism such as Yawelmani (Kaun 1995; Jurgec 2013, and sources cited within), it is asymmetrical: the application of height harmony critically depends on the presence of an underlying [+ATR] feature. This asymmetry is consistent with the assumption that recessive vowels are unspecified: if height harmony is dependent on the presence of an underlying ATR specification, it follows that segments lacking such values should be unable to trigger it.

Height harmony is illustrated below in (17).[11]

(17) Parasitic [+high] spreading
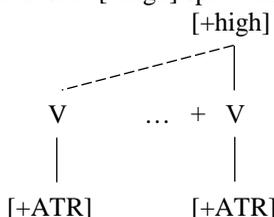
It is worth pointing out here that this rule does not specify that the target must be [-low], yet it also does not apply to [+ATR] low vowels (as in (14)). I assume that /ə/ vowel is not targeted by raising

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[10] This plural/singular pair has also been elicited as *tétón*/*títíntì*, which exhibits the appropriate raising as well as an infrequent rule that fronts *u* between adjacent high front vowels.

[11] I include a morpheme boundary here to account for forms like (16b) (and perhaps (16c)). Given that roots tend to avoid having vowels that disagree for [±high] (reflected in my corpus as well as Yokwe 1987), it would also be possible to eschew the boundary and treat these as lexical exceptions. This would not weaken the evidence for the hypothesis; even if a height co-occurrence restriction exists in the lexicon generally, the fact that productive [+high] spreading is parasitic on [+ATR] is what we predict if recessive vowels are unspecified.

for two reasons. The one which follows from the general analysis to come is that because /ə/ is [+low], attempting to raise it would result in an antagonistic [+high, +low] specification. A secondary consideration is the fact that even if /ə/ could raise, doing so would result in a [+ATR] high vowel (e.g. *[ɨ]); that is, the application of height harmony to /ə/ is not structure preserving. However, there is no evidence in my corpus that can directly determine whether /ə/ is transparent or opaque to height harmony.

To summarize our arguments thus far, we have seen that both general ATR harmony and parasitic height harmony support the hypothesis that the dominant [+ATR] feature is the only one which is specified. In both cases, the [+ATR] specification of the triggering vowel is important, and in the latter case, the [+ATR] specification of the target vowels is also important. In the following two subsections, we will see that non-parasitic and primarily local forms of assimilation generally also follow this trend of requiring the presence of a [+ATR] trigger.

3.3 Raising and backing of suffixal /A/   There are three plural suffixes that contain a recessive low vowel: /-À/, /-Àn/ and /-Àt/.[12] These suffixes usually alternate between [a] and [ə] on the surface, as expected. However, when the final root vowel is a [+ATR] mid vowel, these suffixes instead surface as [o]. Examples are given in (18).

(18) Alternation /A/ → [o]
  a.   dǐkól + À   →   dǐkólò   'clouds'
  b.   kíŋòŋm + À   →   kíŋòŋmò   'pythons'
  c.   ŋídól + À   →   ŋídólò   'gums'
  d.   lòmbé + Àt   →   lòmbéʲòt   'cheeks'
  e.   sókór + À   →   sókórò   'chickens'

This alternation is only productively triggered by [+ATR] mid vowels; recessive mid vowels do not trigger an alternation /A/ → [ɔ].[13]

(19) No alternation /A/ → [ɔ]
  a.   mÉkÔr + À   →   mɛ́kɔ̂rà   'water buffalos'
  b.   jÁrÓ + À   →   járɔ́ʷà   'hippos'[14]
  c.   tÚrÉ + À   →   túrɨ́ʲà   'sticks'
  d.   kÍkÔl + Àn   →   kíkɔ́làn   'roads'

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[12] It may be the case that these are three allomorphs of the same suffix; if this is the case, then choice of allomorph is largely unpredictable, with some semi-productive phonological cues; for example, /-À/ tends to be concatenated with high-toned disyllabic roots.

[13] There is one exception to this: *tápéŋɔ̀t* 'guinea fowls.' Here, an alternation beween [a] and [ɔ] surfaces even though the root vowels are apparently unspecified. However, it would be possible to mark this item as a lexical exception that is subject to an unusually high pressure to spread the [-high] feature, similar to the analysis of the exceptional suffix in the following subsection. More problematic is this word's singular form, which is is *tápíŋî*, which appears an instance of mid vowel raising triggered by an (unexpected) recessive allomorph of the /-i/ singular suffix. There is no straightforward analysis of this form under the dominance-as-markedness hypothesis; the only possibility is to assume that the forms are memorized.

Interestingly, both words are transcribed with [+ATR] vowels in Yokwe 1987, so this may reflect an ongoing sound change for this word—that is, the vowels have all become [-ATR], but it has retained its phonological behavior.

[14] There is a competing pattern displayed by some mid V-final roots, where the final vowel raises (possibly conditioned by the epenthetic glide). When these contain [+ATR] vowels, the suffix usually surfaces as [ə], not [o], e.g. tòré+Àt → tòrɨ́ʲòt 'flutes.' The failure of /Àt/ to surface as [òt] in my data is consistent with the observation that high vowels block this alternation.

A second generalization is that this alternation does not occur if a high vowel intervenes between the mid vowel and the suffix, as seen in (20). This is a critical difference between this and either form of harmony.

(20) High vowel blocking

a.	lùmə́ŋgòrít + Àn	→	lùmə́ŋgòrítən	'stag beetles'
b.	ɓóbút + Àn	→	ɓóbútən	'antelope sp.'
c.	kèdĭ + Àt	→	kèdĭʲət	'pumpkins'
d.	kèlî + Àt	→	kèlíʲət	'songs'

Hall & Yokwe (1981) and Yokwe (1987) treat this as productive raising conditioned by adjacent [+ATR] mid vowels. We can capture this by assuming that [+ATR] mid vowels spread [-low] to adjacent, heteromorphemic instances of /A/; this process can thus be viewed as feature-changing. The conception of dominance being considered here is supported by the fact that, again, the triggering vowels must be specified as [+ATR]. While the targets are apparently exclusively recessive vowels, there are no counterexamples suggesting that suffixal /ə/ could not also raise; as such, there is no necessary [-ATR] specification for this rule.[15]

(21) Raising of suffixal /A/

```
        [-low]      [+low]
          ╷⌐‑‑‑‑‑‑‑‑‑┤
          │          ╪
          V    +     V
           ╲        ╱
            ╲      ╱
         [-high] [+ATR]
```
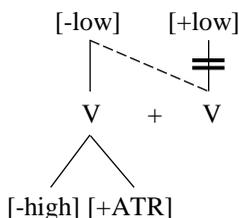
A more serious issue is how to capture the generalization that suffixal /A/ can surface as either [ə] and [o], given that there is no requirement for the root mid vowel to be round.[16] It is the case that many (Eastern) Nilotic languages have undergone a merger of */a̰/ with either /ɔ/ or /o/, which is often reflected directly in the harmony system. Particularly famous cases of this include Turkana and Maasai, both of which exhibit (partially) productive alternations between [a] and [o] (Baković 2000, 2002; Dimmendaal 2002, and sources cited within).[17]

However, an analysis relying on some aspect of harmonic re-pairing or assuming some form of merger for Bari is inappropriate for two reasons. The first and less important of the two is that as will be seen in the following subsection, it is also possible for /A/ to alternate with [e] in

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[15] Technically, there would be no necessary [-ATR] specification even if we could see that suffixes containing /ə/ do not raise. Like the exceptional fronting of /A/ discussed in the next section, we would assume that the raising of suffixal /A/ is dependent on the presence of a multiply linked [+ATR] feature. /ə/ is assumed to have its own [+ATR] specification, so the rule would be blocked.

[16] In my data, all cases of this process apply to roots that contain at least one [+ATR] mid round vowel; however, Yokwe 1987 contains many more examples of it occurring with [+ATR] mid front vowels. This means it is not possible to describe this as labial harmony.

[17] A reviewer points out that Teso-Turkana languages specifically also have some suffixes containing /ɔ/ that spread [-ATR] to [+ATR] root vowels (Rottland & Otaala 1983; Baković 2000, 2001; Dimmendaal 2002). This is a similar pattern to the one discussed in fn. 14. How this can be handled if we assume that [-ATR] is unspecified in [+ATR]-dominant systems is an important one that Casali also raises. However, the reviewer also notes that cases in which this has occurred outside of Teso-Turkana (e.g. Maa and possibly Lotuxo) have shown a tendency to eventually regularize.

some contexts. This alternation is lexically specific and exclusively triggered by front vowels, however, so this is not strong evidence against a merger analysis on its own.

The second and arguably more compelling reason is that unlike other Eastern Nilotic language groups—and indeed, unlike most Nilotic languages—the Bari group languages have typically retained all ten vowels, with the synchronic reflex of */a̧/ typically being described as strikingly high and central (Hall & Creider 1998; Cohen 2000). This fact is reflected in both Yokwe's descriptions of the language as well as data from my own speaker. Indeed, if anything, this height distinction seems to be becoming more pronounced: Yokwe (1978) describes [ə] in Bari as "approximately the height of cardinal [ɔ], but… not as far back as [ɔ]." My consultant's [ə] tended to be closer to the [+ATR] mid vowels in height, and both vowels were extremely central in terms of place.

Given that there is no evidence for a synchronic [+back] (or [+round]) feature associated with low vowels in Bari, and given that there is no evidence supporting a merger, we will instead find it necessary to appeal to markedness in order to explain the patterning of /A/ with [o] in these contexts. Namely, we will need to assume the following: while there is no requirement for low vowels to have a place feature, there is a requirement for a non-low vowel to have one. The changing of the suffix vowels from [+low] to [-low] thus compels the filling in of a feature, and of the two options [+back] or [-back], [+back] is less marked.

In addition to this pattern's connection to the dominance-as-markedness hypothesis, this pattern also has an interesting consequence with respect to the formal conception of markedness that we are considering more generally. While it is not possible to treat the back/front distinction in vowels as dominant-recessive, it is possible to extend our assumption that markedness is equivalent to specification for all forms of markedness. If we take this extreme stance, then because [+back] appears to be the default, unmarked value, it should be unspecified.

If this is true, then under our current assumptions, we would expect that front vowels, like [+ATR] vowels, should be better triggers of assimilation than back vowels, as only front vowels have place features to spread. This is technically true: the only case of uncontroversial place assimilation in the language is the lexically specific fronting of root /A/ to be discussed in the next section. There is also a semi-productive process that fronts root-internal /u/ when it is preceded by /i/ and is not word final, as seen in forms such as *kébílù ~ kébìlítjò* 'sheep,' though forms like this are relatively rare. However, in most other respects, (mid) back vowels do not pattern as particularly less marked than front ones, and certainly not to the same degree that [-ATR] vowels pattern as less marked than [+ATR] ones; there is no strong co-occurrence restriction between front and back vowels, no evidence of robust front assimilation, and no obviously significant difference in distributional frequency between the two sets, etc. (Rice 2007).

3.4 Exceptional fronting of root-internal /A/ The final process to be discussed is a form of exceptionality conditioned by the singulative suffix /-i/. This suffix triggers both ATR harmony and mid raising normally; however, it also triggers the raising and fronting of recessive root low vowels to [e], as seen in (22):

(22) /A/ → [e]

a.	kàjátàl + i	→	kə̀ə́tèlî	'sweet potato'[18]
b.	gbándàl + i	→	gbə́ndèlî	'yam'
c.	tálám + i	→	télémì	'monkey'
d.	pátál + i	→	pə́télì ~ pételì	'rope'

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[18] The loss of the [j] here is another optional rule. Intervocalic glides are sometimes deleted, especially between identical vowels. This happens more in fast speech; in slow speech, the glides resurface.

The domain of application of this process varies by lexical item. (22a,b) only ever show local effects, while in (22c), the process extends to both low vowels. (22d) is variable; some tokens show a local effect while others are long-distance.

In addition to the uncertain scope of this process's application, there is an additional complication: cases of root-internal underlying /ə/ *never* front, as seen in (23).

(23) No fronting of root-internal /ə/
  a.   lùmə́ŋgòrít + i   →   lùmə́ŋgùrítî, *lùmə́ŋgùrítî   'stag beetle'[19]
  b.   dúmə̀t + i   →   dúmə́tì, *dúmétì   'mourning ceremony'

The number of examples of fronting is admittedly quite small, and the pool of elicited examples of /ə/'s failure to front in this context is even smaller. While it is possible that this is an accident of the data, there are a number of factors that suggest otherwise. The first is that fronting is only triggered by /-i/; other suffixes containing /i/ do not trigger it, as seen in (24a-b). It is also the case that fronting does not seem to apply if there is not a strictly local instance of /A/, as seen in (24c).[20]

(24) No fronting from other dominant suffixes
  a.   sÍwÀ + ti   →   síwə̀tî   'honeybee'
  b.   mÁŋgÀ + ti   →   mə́ŋgə̀tî   'mango'
  c.   mÁrÙk + i   →   mə́rúkî   'mushroom sp.'

There are also morphological and phonological factors at play here that reduce the possible pool of examples. First, singulative marking is rare relative to plural marking, which restricts the pool of potential examples. Second, there are distributional restrictions on /-i/ that make it less likely to surface. All cases of /-i/ in my data are concatenated with C-final roots (suggesting that /-i/ is restricted to a C-final environment), but other "competing" singular markers such as /-ti/ and /-It/ can also occur in this environment (e.g. *kwèntî* 'bird,' *mɔ̀rínìt* 'fingernail'). /-i/ also occurs much more frequently after roots containing *mid* vowels than low vowels. As for the even greater rarity of instances of /ə/'s failure to raise, this is most likely because while /ə/ does form minimal pair contrasts in Bari (e.g. *kʊrʒu* 'till' and *kərʒu* 'spoil'; *têr* 'desert' and *tə̂r* 'flood'), it is still much less frequent than other vowels.

A final factor is that while this pattern was consistent across tokens from my consultant (absent the aforementioned variation), it does not appear in previous descriptions of the language. This suggests that if this is not an idiosyncrasy of my speaker, it is an innovation, and thus may be exceptional. However, this is not a valid reason to remove the pattern from consideration. Quite the opposite: it has been demonstrated that at least for syllable structure, exceptions conform to language-specific phonological generalizations (Hout 2019), and this tendency extends to featural representation (Hout 2016, *in prep*; Hout & Baković *in prep*). As such, while fronting is likely exceptional, it is still reasonable to expect it to conform to the representational specifications required by the dominance-as-markedness hypothesis. This is important, because of the four forms of assimilation discussed in this paper, fronting poses the most serious challenge to Casali's proposal.

The primary issue that the dominance-as-markedness hypothesis predicts that only two categories of phonological operations can exist in Bari: those that are somehow dependent on an

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[19] This example has an additional syllable intervening between the suffix and the target root vowel, which may itself be preventing the application of fronting (especially given that it is not local to the triggering segment). I include it because it is one of the few examples of a possible application of this process to an underlying /ə/.
[20] The behavior of (24c) may not actually be due to locality, but due to the fact that the intervening vowel is back, and thus may block the spread of [-back] due to being already specified. This would require us to relax our assumption that [+back] is unspecified.

underlying [+ATR] specification, and those which are indifferent to [±ATR]. Fronting, however, seems to fall into neither of these categories. However, the failure of fronting to apply to dominant low vowels makes it appear that it is the *recessive* value of [±ATR] that is important. This is a problem, because if we must rely on a necessary specification of [-ATR], then the dominance-as-markedness hypothesis cannot be correct.[21]

However, under the representational framework that we are assuming, it turns out that there are several analytical avenues by which the dominance-as-markedness hypothesis can still be preserved. Of these, I will argue that exceptional spreading of [-back] fed by the application of ATR harmony is the most compelling, as other options ultimately leave some generalizations unexplained or require assumptions not strictly supported by the data.

The arguably simplest option is to move the problem from phonology to morphology, and to treat the "alternation" as allomorphy. This is not an entirely unattractive idea; it is certainly the case that much of Bari's number marking system can be described as allomorphic. There is also at least one instance of [a] ~ [e] ablaut in Bari: *kálá* 'teeth' vs. *kélé* 'tooth.' Moreover, for this same lexical item, there is a third singular option: *kélétî*, which seems to combine ablaut with the suffix /-ti/.

Under this analysis, we would have to assume that the suffixation of /-i/ is a redundant number marking strategy, and that the shift to [e] is thus non-phonological. This is perhaps attractive for the dominance-as-markedness hypothesis, and it would certainly be consistent with the form in (22c), but it leaves open several other questions. Of these, the most crucial is the inconsistency in patterning across the few forms that undergo the process. Even if we allow that a form like (22c) *télémì* is redundant, that does not explain why a word like *gbə́ndèlî* 'yams' does not surface as **gbéndèlî*. Why (22d) can surface as *pə́télì* or *pételì* is also left unexplained; even if we assume the latter is ablaut, the former still looks like phonology.

Assuming that this is strictly allomorphy also leaves unexplained the fact that while this pattern is rare, it is still general: every instance of the concatenation of this suffix with a root containing /A/ shows at least a local fronting effect, and every instances of its concatenation with a root containing /ə/ exhibits no fronting. This type of local behavior is consistent with other attested cases of phonological exceptionality, including those pertaining to vowel harmony (Mahanta 2008, Finley 2010).

The better option then is to treat this as a lexically-conditioned phonological alternation (referred to hereafter as a (phonological) exception). Doing so will allow us to capture the phonological generalizations that characterize these forms, but will also allow us to capture the fact that fronting is exclusive to a small number of words, all of which share a single affix. This type of analysis has two parts: first, we must determine which part of these words (the affix, the alternating roots, or the non-alternating roots) needs to be marked as an exception, and determine what form that marking should take. Second, we need to develop a rule that will account for its behavior, ideally one that conforms to our current hypothesis.

For the first question, it is clearly the affix that should be marked as an exception. If we assume that either the alternating or non-alternating roots are exceptions, then one of the two sets would need to be marked either as either undergoers or non-undergoers of fronting. But, again, while this pattern is morpheme-specific and rare, it is general: every instance of a root containing /A/ shows at least a local fronting effect, and both roots containing /ə/ do not. This means a choice between which type of root to mark as "exceptional" is arbitrary.

Moreover, I would argue that treating the roots as exceptions is problematic on a more fundamental level. Marking the roots as exceptional (non-)undergoers suggests that we should be

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[21] It is worth pointing out here that this scenario is distinct from the problem posed by *tápéŋɔ̀t* and *tápíŋî*, discussed in fn. 14, as in this case the triggering vowel is [+ATR]. As pointed out earlier, these words may have previously had [+ATR] vowels. If this is the case, then the fact that fronting does not apply in the presence of the singular suffix (assuming it is indeed a recessive allomorph of /-i_e/) is consistent with the fact that fronting cannot apply to /ə/.

considering fronting to be a more general process in the language than it actually is—that is, we seem to be suggesting that fronting *should* be triggerable by any dominant suffix containing /i/ (or perhaps any suffix containing a high front vowel). The only option to avoid this would be to stipulate that [-back] cannot spread over consonants in affixes, yet *can* spread over consonants in roots.

The intuitively more satisfying alternative is to assume that it is the suffix that idiosyncratically triggers fronting, presumably by spreading the [-back] feature that we have already determined must be present on high front vowels. If this is the case, then the pattern can be properly viewed as an exceptional derived environment effect or *saltation*. This is a case where a change from some underlying form A to a surface form C skips some intermediate and non-alternating B (Hayes & White 2015). Here, the shift from /A/ → [e], which entails changes in ATR, place, and height, is formally more complex than the shift from /ə/ → [e], which entails only shifts in place and (phonological) height.

If we assume that the suffix is an exceptional trigger, then we will find it necessary to diacritically mark it is as such (rendered orthographically as a subscript $_e$, i.e. /-i$_e$/). We use a diacritic because to do otherwise requires us to make an *ad hoc* assumption regarding the underlying specification of /-i$_e$/, which otherwise behaves like a normal /i/-containing suffix in all other respects.

The choice to treat this process as exceptional saltation is important, as it suggests that the spreading of [+ATR] is crucial in some way. In our current autosegmental framework, we can capitalize on this by restricting the rule of fronting to low vowels with *multiply-linked* values for [+ATR]; that is, /-i$_e$/ can only spreads [-back] if ATR harmony has already occurred, as illustrated in (25).

(25) Exceptional fronting fed by ATR harmony
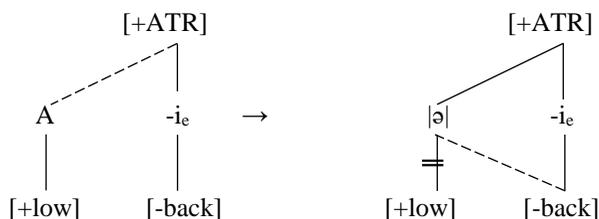
Because we are currently assuming that [+ATR] cannot spread from a [+ATR] vowel to another [+ATR] vowel, there is no way for /ə/ to gain a multiply-linked feature, and so by default fronting will be blocked.[22]

This analysis is consistent with the dominance-as-markedness hypothesis in two ways. One is that spreading of [-back] is dependent on having a multiply-linked [+ATR] feature; that is, it is the [+ATR] specification of the triggering vowel that is important. The second is that the failure of [-back] to spread to /ə/ is also dependent on its specification: because underlying /ə/ is already specified, harmony is blocked, and so the conditions for spreading [-back] are not actually met.

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[22] It would be possible to analyze this without ordering if we assume that [+ATR] can spread concurrently with [-back]; however, this would seem to require an assumption that [+ATR] and [-back] are contained under a single node. Cogent arguments have been made to suggest that while [±ATR] and [±high] should be linked, vowel place feature nodes should be considered separate (Odden 1991).

There are of course alternative analyses that can capture this pattern without a reliance on rule ordering. These require us to make abstract representational assumptions regarding the underlying specification of /ə/ that distinguishes it from |ə| (and by extension /A/).[23]

We could, for example, assume that /ə/ is fully specified for its centrality, while maintaining our current assumption that /A/ is placeless; that is, /ə/ is [-back, -front], while /A/ (and therefore |ə|) is [0back, 0front]. If [-back] is already specified, then [-i$_e$] presumably cannot spread its own [-back] feature, or else the spreading will have no effect. However, this introduces a couple of problems. First, if we assume the presence of a [±front] feature, we end up with either redundant feature filling operations or redundant featural specifications for front vowels, when [±back] is otherwise sufficient to distinguish them. Moreover, it is now a more or less arbitrary decision as to whether to specify front vowels as [+front] or [-back], as either distinction is now equally valid from an analytical perspective. Finally, while it is the case that [ə] is phonetically central, so too is [a]; both exhibit average F2 values around 1650 Hz. Thus, there is no phonetic evidence suggesting a place distinction between the two low vowels. All of this considered, positing an underlying [±front] feature seems to do no work except to block the application of fronting in a tiny handful of exceptional cases.

An alternative that is somewhat more grounded in phonetic reality would be to assume that /ə/ is not actually [+low]; as discussed previously, [ə] is acoustically more like a mid vowel in terms of F1 than a low one. However, again, this is *generally* true for [ə], regardless of whether it comes from /ə/ or /A/. Additionally, /ə/ does not otherwise pattern like a mid vowel. It is not subject to height harmony, as was already illustrated by the singular-plural pair *lùmə́ŋgùrítî ~ lùmə́ŋgòrítə̀n* 'stag beetle'. While it could be reasonable to assume that this is because raising /ə/ to a high vowel (e.g. *[ɨ]) is not structure preserving, /ə/ also does not trigger backing of /A/ in suffixes, as illustrated by forms like *múkə́kə̀* 'backs/waists' and *kàrbə́bə̀lə́ŋə́n* 'earlobes.' As such, this assumption seems to be a case of opportunistic underspecification—we are imposing a featural distinction where one does not need to exist for the sake of rhetorical convenience (Steriade 1995).

Both of these analyses are flawed in another way, which is that they are overlooking the fact that there is *already* an available representational distinction between /ə/ and |ə|; /ə/ is presumed to be linked to a single [+ATR] feature, while |ə| is multiply-linked. Positing additional feature specifications means losing a great deal of generality in favor of removing derivations.[24]

4. Summary and Conclusion

This paper has examined a consequence of the formal claim made in Casali 2016 regarding the relationship between markedness and specification of dominant ATR features; namely, that if dominance is indeed equivalent to markedness, and if markedness is equivalent to specification, then it must also be the case that no phonological process in a dominant-recessive system should necessarily rely on reference to the recessive, unspecified value. As seen in the preceding section, the behavior of four assimilatory processes in Bari (ATR harmony, parasitic height harmony, raising

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[23] Indeed, we can even obviate the need for a diacritic on /-i$_e$/ if we stipulate that place features cannot spread over consonants in affixes. However, this would leave a number of patterns unexplained, such as the alternation of u ~ i in roots, as well as the variation in the application of fronting.

[24] If we adopted a framework that does not allow for derivations, such as Optimality Theory or Harmonic Grammar, we would of course would not be able to rely on any notion of "feeding" to satisfy this rule. However, it seems unlikely that doing so would actually reintroduce this problem, as it would not be necessary to rely on this degree of structural specification to generate a workable analysis. A full analysis under either framework is well outside the scope of this paper, as it would require a fundamentally different set of assumptions that are independent of the dominance-as-markedness hypothesis. However, the assumptions motivating the analysis of fronting would simply be that /-i$_e$/ is subject to exceptionally high markedness pressures to force agreement for [-back] in addition to [+ATR]. The portion of this independent of the question of exceptionality would be capturable via either local constraint conjunction in OT (Smolensky 1997, 2006; Łubowicz 2002), or a gang effect in HG (Legendre et al 1990; Smolensky & Legendre 2006; Pater 2016).

and backing of suffixal /A/, and exceptional fronting of root-internal /A/) are analyzable under an autosegmental framework without reference to a recessive value of [-ATR], and indeed, all four in some way rely on a necessary specification of [+ATR]. As such, the patterns of assimilation in Bari support the dominance-as-markedness hypothesis.

The first three processes were relatively straightforward. First, ATR harmony was shown to be [+ATR]-dominant. Given that [+ATR] is the spreading feature, and can only spread from [+ATR] vowels, it is the more important value. Second, height harmony was shown to be parasitic on [+ATR]; as such, the [+ATR] value of both trigger and target are equally important. Third, the backing of suffixal /A/ could only be triggered by [+ATR] mid vowels; as such, the specification of [+ATR] on the trigger is once again important.

The least straightforward of the assimilations was the exceptional fronting of root-internal /A/; this was due to the fact that fronting *only* applies to /A/ and never /ə/. However, this too was ultimately shown to conform to the hypothesis, without the introduction of additional representational machinery. This was done by assuming that the application of fronting is also dependent on the application of ATR harmony; that is, it is not that /A/ is a good target for fronting because it is [-ATR], but rather that /ə/ is a bad target because its underlying [+ATR] specification prevents it from gaining a multiply-linked [+ATR] feature.

A remaining question is how generalizable the results from Bari are. One important generalization to make here is that in all four cases, a [+ATR] specification of the triggering vowel is either more important or at least equally important as the specification of the targets. De Lacy (2002, 2006) has previously argued that triggering assimilation is good evidence for the marked status of some feature, while undergoing assimilation is not good evidence for it. The patterns in Bari are thus consistent with this observation as well.

That said, it is also the case that Bari is atypical (in a broad cross-linguistic sense) in its retention of an ATR contrast in low vowels. This makes Bari both an extremely important and unimportant test case for this hypothesis. If a language like Bari, with its fully symmetrical vowel system, contained a pattern that falsified the hypothesis, that would be exceedingly problematic. However, a language like Bari, with a fully symmetrical vowel system, also has the fewest imaginable avenues for the hypothesis to be falsified.

What would truly be compelling evidence for the dominance-as-markedness hypothesis would be if patterns as extreme as Bari's were also observed in languages with especially asymmetric vowel inventories, such as 11-vowel languages like Anii (Morton 2012) and atypical 8-vowel languages like Igbo, which is missing /ɛ/ (Ladefoged 1968; Zsiga 1997). Similarly, the process of exceptional fronting in Bari necessarily relied on the application of ATR harmony to generate a multiply linked instance of [+ATR]. [-ATR]-dominant languages, however, typically do not have productive [-ATR] harmony, which means no such tool would be available (Casali 2003).

Finally, while the cross-linguistic patterns of dominance seem to be borne out descriptively, an important question remains, which is whether underspecification is the correct approach to analyzing markedness at all. An argument from de Lacy 2006 that is not addressed in Casali 2016 is that underspecification is *not* the correct analysis of markedness relations, preferring instead to characterize it as a universal hierarchical relationship between feature values. How exactly this would play out with the form of markedness observed in dominant-recessive systems is not entirely clear; however, it is the case that it most likely would capitalize on a relationship between values for [±high] and [±ATR]. This is a subject for future research.

Abbreviations

ATR   Advanced Tongue Root
PL   plural
SG   Singular

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