Activate α : harmony without spreading^{*}

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Abstract

In most privative approaches to melodic structure, the only phonological operations deemed possible are those involving the linking and delinking of primes. However, within an Element Theory model where no independent ATR prime is recognized, this restriction must be relaxed in order to accommodate cases of tongue root harmony. In response, we propose a view of melodic structure in which every position contains a full set of elements; phonological contrasts are then encoded by means of a lexical instruction to 'activate' individual primes. In this paper we demonstrate how these assumptions can provide a satisfactory treatment not only of ATR harmony, but of vowel harmony in general.

1 Introduction

In this paper we consider some of the ways in which the mechanism of vowel harmony (henceforth VH) has been approached in the recent literature. We then address a number of problems associated with these accounts, and offer an alternative view built around the concept of element activation. We begin by looking at the operation of autosegmental spreading, which most multi-linear approaches have conventionally adopted as a means of capturing assimilatory phenomena. While this notion of spreading remains central to Element-based models of melodic structure (Kaye *et al.* 1985; Harris and Lindsey 1995), it fails to provide a suitable account of VH cases involving tongue root position. In order to accommodate such systems, a number of solutions based on the properties of headship have been proposed. These are outlined in section 3, and then explored more fully in section 4.

Although the headed-headless distinction offers an elegant means of expressing tongue root contrasts and harmony processes involving ATR, it forces us to accept an increase in the number of legitimate operations available to the phonology — a move which has clear repercussions for overall restrictiveness. Besides the established operations of

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spreading and delinking, we must recognize an additional device which formalizes the alignment or the special licensing of heads across a domain. A mechanism of this sort has the immediate effect of expanding the predictive power of the model to an undesirable extent. We shall argue, however, that this outcome may be avoided by assuming a full set of elements to be present under every nuclear position. Phonological oppositions are then encoded by means of the lexical instruction to 'activate' individual primes: active elements are interpretable, while inactive material lies dormant in the melodic structure. This is described in section 5. We claim that element activation is appropriate for analysing a variety of VH types, and is equally applicable to the representation of non-harmonic contrasts conventionally referred to as 'segmental'. We also propose that a strict interpretation of Structure Preservation is compatible with the notion of lexical activation, whereas the same principle must be weakened in the context of head agreement. In section 6 we offer an analysis of an ATR harmony system couched within element activation terms.

2 Autosegmental spreading

Since the late 1970s it has been recognized that the standard linear model of phonology cannot be maintained as an adequate means of representing the kinds of phenomena that have been subsumed under the general label 'prosodic'. This description may be taken to involve properties such as, for example, stress patterning. In response, the idea of multi-linear structure has since dominated the theoretical arena, having developed initially from early autosegmental models presented by, amongst others, Goldsmith (1976) and Clements (1977). It has been noticed, however, that we encounter problems if we attempt to draw any absolute distinction between suprasegmental processes of the type envisaged by Goldsmith, and purely melodic patterns formerly referred to as 'segmental'. Certain assimilatory phenomena such as vowel harmony, for example, apparently have recourse to both melodic and prosodic information in their description.

The analysis of Akan vowel harmony, proposed in Clements (1981), was built around this very observation, where harmonic agreement is described as 'a phenomenon located at midpoint between true prosodic characteristics such as stress and tone, and purely local phenomena such as the assimilation of one segment to a neighbour' (1981:55). This amalgamation of melodic and prosodic characteristics is employed by Clements as a means of highlighting the appropriateness of a nonlinear mode of representation, his departure from the linear tradition being motivated in the following way. Vowel harmony may be seen to operate by isolating the kinds of phonological properties (specifically, melodic primitives) normally used to define segments, and then giving them a prosodic, or suprasegmental role. So, a feature such as [-back], which is conventionally specified in the melodic make up of the front vowels \mathbf{e} , \mathbf{a} , \mathbf{i} , $\mathbf{ö}$, etc., may alternatively be abstracted from this segmental level and elevated to a higher position in the phonological structure, where it becomes the property of a larger prosodic domain, typically the word. In the case of [-back] specified as a suprasegmental unit, we observe the palatality effects of this feature across (the vowels of) entire morphemes, rather than individual melodic expressions. Harmonic agreement with respect to palatality is characteristic of a number of Altaic systems, such as Mongolian and Turkish.

If the feature [-back] can be treated in this way, then we expect other melodic primes to be accessed in a similar fashion, creating a range of VH systems observable across different languages. In the paper cited above, Clements focuses his attention on the tongue root harmony system of Akan. Leaving aside some of the rather complex details regarding the distribution of vowels in this language, we may generalize by saying that the vowels within a prosodic word domain all agree with respect to ATRness. That is, the feature value [+ATR] is associated either to all of the vowels in the domain, or to none of them; in the latter case, the default value [-ATR] is supplied. Clements proposes that this pattern is encoded in Akan via a lexical marking which specifies each noun and verb root as either an ATR or a non-ATR morpheme. Then, following affixation, the vowels of affixes tend to reflect this marking. The effects of harmonic agreement are demonstrated in (1), which shows two verb roots that are minimally distinct — they differ only in terms of the presence/absence of morpheme-level ATR.

(1)	a.	tu	'throw'	ɔ-bε-tυ-ι	'he came and threw'
	b.	tu	'dig'	o-be-tu-i	'he came and dug'

The fact that the feature [+ATR] is specified as a property of the word domain, rather than of an individual vowel, is illustrated by the morphologically complex forms above. In the case of (1b), the scope of ATRness is extended beyond the root vowel to all other vowels within the expanded domain. We may assume that the lexicon does not support any tongue root distinction in affixes, and therefore, that affixal vowels are subject to [\pm ATR] alternation, according to the lexical marking of the root to which they are attached.

In order to capture the suprasegmental behaviour of [+ATR] in this system, Clements (1981) adopts the kind of autosegmental structure first presented in Goldsmith (1976), in

which the harmonizing feature is isolated from the remaining melodic material and represented on a separate autosegmental tier. The derivation of an ATR form is shown in (2), where the addition of association lines is typically achieved via a **spreading** operation.

(2) o-be-tu-i 'he came and dug'

The widespread acceptance of this nonlinear model has led to the same process of feature spreading being applied in countless other autosegmental analyses of harmonic phenomena. Indeed, it offers a substantial degree of versatility since, we may assume, any unit belonging to the set of distinctive features may potentially be autosegmentalized in the way that has just been outlined. Familiar harmonic processes may thus be characterized in a straightforward manner: labial harmony (e.g. Turkish) identifies [+round] as a prosodic feature, while height harmony (e.g. Chicheŵa) corresponds to the selection of either [+low] or $[-high]^1$ as the relevant autosegment. In the context of a restrictive generative model, however, this versatility cannot be viewed favourably, since we predict that all available features are equally likely to be accessed as a harmonic property within one language or another. Yet, in the absence of any serious empirical backing, such a prediction cannot be maintained. For example, while nasal harmony systems involving [+nasal] are widespread (e.g. Orejon, Gokana), the complement process of oralisation, which would target the feature [-nasal], is unattested. Let us briefly consider an alternative approach, couched within a theory of monovalent elements, that has attempted to overcome this potential problem.

¹See Mtenje (1986) for discussion.

3 The Element Theory approach

3.1 Introduction

The response to overgeneration of this sort has typically come in the form of a radical revision of the melodic prime inventory. Specifically, it has been acknowledged that a reduction in the number of primes available to the phonology should go some way towards curbing generative capacity. The only permissible units of subsegmental structure would, of course, be those representing phonological properties which are active in observed processes. Generally speaking, revised approaches to vocalic representation have been based on the insights of Anderson and Jones (1974), who posit a triangular vowel space marked out by the three fundamental 'characteristics' given in (3):²

(3) I-ness (i.e. frontness, palatality)U-ness (i.e. roundness, labiality)A-ness (i.e. lowness, openness)

Clearly, a vocabulary of only three melodic primes significantly reduces the potential for autosegmentalisation, the central claim being that the range of harmonic processes exclusively involving vowels (hence, those excluding nasal harmony) should correspond to the set of properties listed in (3).

However, we need look no further than the data in (1) above to see that such a claim cannot be upheld. The harmonic pattern observed in Akan is representative of the kind of assimilation phenomenon which involves an active tongue root property, rather than any of the vocalic properties corresponding to A, I or U.³ Assuming the validity of an ATR-harmony analysis for systems such as Akan, a potential problem immediately arises: within the version of Element Theory (see references in footnote 2) adopted throughout

²The basic A-I-U model has been taken up and developed in a number of different frameworks, including Dependency Phonology (Anderson and Ewen 1987), Particle Phonology (Schane 1984), and Element Theory (Kaye *et al.* 1985; Harris and Lindsey 1995).

³Here we follow the position adopted in Harris and Lindsey (1995) with regard to elemental representations. Other triangular approaches to melodic structure do involve one or more of the resonance elements in tongue root contrasts. See, for example, van der Hulst (1989), where it is proposed that a particular manifestation of the [I] prime contributes ATRness to an expression, while [A] is responsible for RTRness.

the remainder of this discussion, no melodic prime akin to the [+ATR] unit, as exploited in (2), is currently established as an independent object. The absence of a tongue root element is sufficiently well motivated (at least, theory-internally) for us to rule out a spreading account of the data in (1). The challenge for Element Theorists, then, has been one of finding an alternative means of representing the ATR distinction, together with an alternative mechanism for capturing its harmonic properties.

3.2 Head alignment

The most widely accepted solution has opted for a development of the headship properties of the three resonance elements as a way of approaching the question of ATR distribution. Element Theory standardly employs an asymmetric dependency relation which may exist between different primes within the same melodic expression. This allows one element to be identified as the head of that expression, where head status results in (phonologically) relative salience and (acoustically) relative prominence. For example, the vocalic properties of lowness, present in [A], and labiality, present in [U], may fuse in unequal proportions, yielding either the [A]-headed expression (\underline{A}, U) or the [U]-headed expression (A,U). The relative salience of the head element is, in each case, reflected in the interpretation of these expressions as **p** and **o** respectively. For the purposes of capturing the ATR distinction, this notion of headship is harnessed not as a relational property, as in the way just described, but as an intrinsic property of individual elements. Thus, a headed $[\underline{U}]$, for example, may potentially contrast with a non-headed $[\underline{U}]$, the general assumption being that headed expressions (whether single elements or compounds) correspond to ATR vowels, while non-headed structures represent nonadvanced vowels. Returning to the illustration of compounds involving [A] and [U], we may now introduce a third combinatory possibility — a headless expression representing the non-ATR vowel **3**. The three-way distinction shown in (4) is assumed within the version of Element Theory supported in, for example, Harris and Lindsey (1995).

(4) $(\underline{A}, U) = \mathbf{D}$ $(\underline{A}, \underline{U}) = \mathbf{0}$ $(\underline{A}, U) = \mathbf{3}$

The view that ATR distinctions are encoded via headship properties is appealing in a number of ways. Most significantly, we do not need to refer to any independent ATR prime, which is clearly beneficial in terms of generative restrictiveness. Furthermore, we

need not posit any additional structure in order to capture ATRness; instead, we simply exploit what is already present as an established representational property.

Extending this idea to cases of ATR harmony, we may infer that harmony arises from an agreement with respect to headship across a given domain. Let us illustrate this with reference to examples from the ATR harmony language Maasai.

(5)	a.	perr	'split'
	b.	ie	applicative suffix
	c.	a-1-pɛrr	infinitive - class 2 - 'split'
	d.	aa-i-perr-ie-ki	1 sing class 2 - 'split' - applicative - passive

The verb root in (5a) contains no ATR vowels, and hence, no headed vocalic expressions; for the purposes of harmony, it is a headless object. In contrast, the ATR vowels of the suffix in (5b) suggest that this morpheme is lexically marked as a headed object. This is confirmed by the observation that its headedness properties are seen to 'associate' to the vowels of neighbouring morphemes following affixation. The example in (5d) demonstrates these harmonic effects, where the lexically non-ATR root *perr* 'split' is interpreted with the headed vowel **e**, under the influence of a headed object elsewhere in the domain. Here we illustrate one proposal which has been put forward, within the restrictive context of Element Theory, to account for the way in which headship harmony of this kind may be achieved. We refer to the head alignment mechanism employed by Lowenstamm & Prunet (1988), Harris & Lindsey (1995), and others.

Harris and Lindsey (1995) employ the case of ATR harmony in Akan to illustrate the way in which the process of head alignment operates. As an alternative to feature spreading, the Element Theory view centres on the claim that harmonic effects arise from changes in the internal representation of harmonizing vowels, such effects being triggered by particular characteristics of a dominant vowel present in the relevant domain. Given the means by which the tongue root distinction is captured in (4), it follows that these changes should typically involve a switch in the headship status of nuclear expressions. For instance, within the set of non-low vowels, an expression which is lexically non-ATR may acquire full-headedness in the environment of a dominant ATR vowel. It is in this way that head agreement is achieved, where the head elements of every vowel within the relevant span are aligned on the same melodic tier.

Let us recast the Akan data given in (1) in terms of this alignment mechanism. As the examples in (6) demonstrate, harmony is captured by means of headship agreement,

where headedness may be most appropriately viewed as a property belonging to a melodic tier, rather than to individual elements. In representational terms, then, the effects of harmony are such that all elements on the designated harmony tier are uniformly either headed or headless (where headed status is indicated by underlining).

(6) a. $\beta - b\varepsilon - t \upsilon - i$ 'he came and threw' b. $\rho - b\varepsilon - t \upsilon - i$ 'he came and dug'



The vowels in (6a) are all lexically headless. The absence of any (dominant) headed expression in the word allows each vowel to remain structurally unaltered, thus yielding the non-ATR interpretation $z - b\varepsilon - t - \iota$. The representation in (6b), on the other hand, is characterised by the presence of a lexically headed expression in the verb root tu (see (1b) above), which has a harmonizing effect on affix vowels. We arrive at the aligned configuration in (6b) by allowing the headship status of recessive vowels to be manipulated via an ON/OFF setting. So, for example, an operation of head switching permits a lexical \mathfrak{d} (U,A) to be interpreted as \mathfrak{d} (U,A) under harmony conditions. As we now demonstrate, this head alignment approach also serves as the basis for a formalized view of headship agreement — in the shape of head licensing — which is applied and developed in, for example, Cobb (1995) and Walker (1995).

3.3 H(ead)-licensing

The mechanism of H(ead)-licensing (see, for example, Walker (1995) and references therein) offers a formalized account of the way in which head agreement is achieved across a specified domain. However, since the precise details of this procedure are not

central to the present argument, we bypass any detailed discussion of the implementation of H-licensing, and instead, refer the reader to the references cited above. Of more immediate relevance is the question of how H-licensing may be incorporated into an overall theory of phonological well-formedness. Its proponents view the mechanism essentially as a 'lexical function' which maps headless expressions on to headed ones, although it may also apply in a derivational capacity (where harmony is found to occur in morphologically complex forms, for example). In either case, the melodic configurations which come about via H-licensing must interact with a number of language-specific licensing constraints, the latter serving to restrict the way that elements are permitted to combine within any one system.⁴

Given that both of these devices — H-licensing and licensing constraints — are involved in the manipulation of the same phonological property, that of headship, it is inevitable that a certain degree of conflict will arise with regard to their respective predictions. In some instances of clashing, licensing constraints are overridden, in order that the output of the H-licensing function can remain intact (and thus, be interpreted successfully). In other instances, however, constraints behave as inviolable requirements on structural grammaticality and, as such, force the breakdown of the H-licensing process. In view of this dynamic behaviour shown by H-licensing, its status within the grammar appears somewhat indeterminate. The possibility of resolving grammar-internal conflict on a language-specific basis suggests an approach that is reminiscent of the constraint ranking found within Optimality-Theoretic (OT) models (Prince and Smolensky 1993); in OT, the violation of a constraint is sanctioned only in order to ensure that the conditions prescribed by a more highly ranked constraint (located in a language-particular hierarchy) are met. However, if H-licensing is to be most appropriately seen as a wellformedness constraint on output representations, on a par with the other grammaticality constraints with which it interacts, then its defining characteristic as a *lexical* function is somewhat undermined.

The recent literature has seen a number of attempts to extend the application of head licensing to a wider range of languages exhibiting tongue root harmony. Although the outlook is not altogether discouraging, the results seem to indicate that the H-licensing mechanism cannot be subject to the kind of rigid definition that had originally been

⁴Licensing constraints are central to the theoretical context in which H-licensing has been conceived. They typically take the form of generalisations regarding the headship of particular elements: for example, the constraint *[I] does not license operators* is argued for in the description of the Turkish vowel inventory (Charette and Göksel 1994).

proposed. Instead, the focus of its development appears to be centred on the incorporation of parametrically controlled properties, in place of absolute requirements. For example, Cobb (1995) suggests that the domain of H-licensing (in Zulu) need not correspond directly with either morphological or prosodic categories,⁵ while it is proposed in Denwood (1995) that the directionality of H-licensing be specified on a language-particular basis. In the same paper, Denwood also raises a number of theory-internal matters, such as the predicted incompatibility between the mechanism of H-licensing and the presence of phonologically empty nuclei. The references given above provide discussions of these, and other recent developments in the formulation of H-licensing; these issues will not, however, be pursued here.

Of greater significance to the present argument is the question of the appropriateness of headship harmony to a restrictive theory of well-formedness — whether this is achieved by referring to melodic tiers, following Harris and Lindsey (1995), or to Hlicensing, as in Walker (1995) and elsewhere. In other words, how successfully may this approach be incorporated into our established view of phonological structure? In the following section we shall argue that head agreement may be considered problematic in two particular respects. First, it is a structure-altering mechanism, and, as such, is incompatible with a generally established principle of grammar. Second, if we choose to sanction structural (i.e. headship) agreement as a manifestation of vowel harmony, then it must exist in addition to, rather than in place of, the established analysis of vowel assimilation as feature/element spreading. Under the assumption that a spreading mechanism is still required in the description of, for example, rounding or palatal harmony, we are then forced to recognize two independent ways — spreading and head agreement — of representing what is essentially the same harmonic effect.

4 Headship harmony: some disadvantages

4.1 Structure Preservation

Recall the Maasai data in (5) above, where we showed how the vowel of a lexically non-ATR morpheme is interpreted as an ATR expression when that morpheme falls within the

⁵In effect, this analysis allows a harmonic domain to be described independently of the harmonic mechanism employed. This view has much in common with the Optimal Domains approach to harmony, as presented in Cole and Kisseberth (1994).

scope of a suffix that is lexically marked for ATR. The vowel of the verb root *perr* 'split', specified lexically as ε , is interpreted as ε under the harmony conditions prevailing in (5d): thus, the melodic expression (A,I) shows up as (A,I). As we have already seen in §3, it is via headship properties that Element Theory captures this tongue root distinction; and consequently, it is proposed that head-dependent relations can be manipulated, or **switched**, in order to account for harmonic alternation (see, for example, Charette and Göksel 1994). We shall claim, however, that a mechanism which allows head status to be created or dropped (due to suffixation) poses a potential obstacle to the established idea of Structure Preservation (SP).

Although the term SP has been employed in the phonological literature for some considerable time, theorists have been less than consistent with regard to a precise definition of its status and function. The earliest reference to SP is found in Selkirk (1982), where 'structure' specifically relates to syllable structure. Here, the central claim is that syllabic configurations produced during derivation (via resyllabification rules) must conform to the syllable template of the language in question. What is preserved, then, is the set of lexically possible syllable types. Some time later, Kiparsky (1985) transfers a similar conception of SP to melodic structure, where he proposes a ban on the creation of segments which are unable to contrast lexically. That is, a melodic expression produced during the course of derivation must already be a member of the language's segment inventory. Once again, therefore, it is a particular set of lexical possibilities which must remain intact.

In some representational models, the emphasis on preserving phonological structure has been extended to include not only the individual units referred to at the lexical level, but also the particular relations holding between those units. This position is perhaps most strictly maintained in the Government-based literature⁶ where, following the view currently established within syntax, it is assumed that the licensing relations present at derived levels of representation are necessarily the same as those given lexically. Harris (1994a) offers a phonological instantiation of structure preservation which requires that licensing conditions holding of lexical forms also hold of derived representations. As with earlier formulations of SP, this has the effect of preventing a phonological process from adding to a language's inventory of prosodic templates or patterns of melodic association defined in the lexicon. On the other hand, Kaye *et al.* (1990) choose to develop the issue of SP primarily in relation to prosodic structure — that is, in relation to those lexical categories that are (potentially) projected. This is achieved by making a direct appeal to

⁶See, for example, Charette (1991), Harris (1994a), Brockhaus (1995), and references therein.

the representation of syntactic structure, and specifically, to the Projection Principle (see Chomsky 1981, 1986). The latter requires that relational properties (e.g. subcategorization) be 'projected' from the lexicon on to the derived structure, thus ensuring that lexical structure is fully represented at every syntactic level. We observe the effects of this projection in a number of ways. For instance, head-complement relations established in the lexicon must be preserved throughout derivation — the head/complement status of an object is immutable with respect to any dynamic structural operations. From this, it follows that the categorial status of lexically specified constituents must similarly remain fixed. So, if a position is projected from the lexicon as a verb phrase, then it cannot lose this identity during the course of derivation.

As Kaye *et al.* (1990) demonstrate, there are clear advantages to be gained from transferring the syntactic notion of lexical projection to the phonology. In a Governmentbased approach, it is assumed that all prosodic units must participate in licensing relations with each other,⁷ and that such relations contribute to the well-formedness of lexical objects. By allowing the Projection Principle to constrain phonological derivation (thus ensuring that the licensing relations present in the lexicon are maintained at all levels), we are able to make the (desirable) prediction that no resyllabification operations of any kind will be permitted. This result is obtained if we assume that a timing unit which is resyllabified must either undergo some change in its categorial status, or otherwise must be involved in a change affecting prosodic licensing relations.

However, from the discussion in §3.3 it is evident that, like prosodic units, the melodic elements, together with the relations holding between them, are also subject to certain licensing conditions; this much is clear from the way in which (melodic) licensing constraints are formulated and expressed within the model.⁸ If we consider the notion of licensing to be responsible for the well-formedness of both melodic and prosodic structure, then it is reasonable to make the further assumption that the nature of licensing relations ought to be determined, in both cases, by the same set of principles (some of which are universal generalisations, others system-specific). In other words, the principles of licensing should determine the grammaticality of structure *in general* — an assumption that highlights the way in which the notion of licensing may be seen to unify the different

⁷This requirement results from the Phonological Licensing Principle (Kaye 1990), which demands that all phonological units, with the exception of the ultimate domain head, must be licensed.

⁸Proposed constraints on element licensing include *Nothing can license [I]* (for English), *Operators cannot be licensed* (for Zulu), *[I] cannot license operators* (for Turkish), and *[A] cannot be a head* (cross-linguistic).

components of a phonological representation into a single coherent structure. On this basis, we can assume that, for instance, the Phonological Licensing Principle (see footnote 7) refers to melodic elements as well as prosodic constituents, since both are to be seen as phonological units that must be licensed within their respective domains.

Having established this theoretical stance, let us return to the question of head switching, by which tongue root harmony is achieved within the standard Element-based model. Recall that a lexically headless object such as ε [A,I] may be interpreted as its headed counterpart ε [A,I] in the appropriate harmonic environment. Here, we claim that a mechanism of the sort which can convert [α] into [α] must constitute a violation of SP, in the sense that the lexically assigned head-dependent relations controlling the organisation of melodic categories — and consequently, the licensing relations responsible for determining headship status — are overridden during the course of derivation.

What justification, then, do we have for endorsing such a switching operation (whether lexical or phonological), when this move apparently reflects a change in the categorial status of lexically specified constituents, and consequently, stands in violation of the Projection Principle? For Element theorists, the answer lies in the claim that the Projection Principle involves only the projection of *prosodic* categories from the lexicon, thus placing melodic structure outside the scope of its influence. We argue, however, that the constraining effects of the Projection Principle are not sufficiently restrictive. An obvious inconsistency arises from the assumption that, while the notion of licensing is equally applicable to both melodic and prosodic units, the preservation of licensing relations is restricted exclusively to the prosodic structure. In response, we propose a highly restrictive interpretation of SP which extends Kaye's implementation of the Projection Principle to incorporate the entire phonological structure.

(7) Structure Preservation

Lexical head-complement relations must be retained throughout derivation

The condition in (7) effectively places a ban on any move which results in a change in the relation between phonological units — where a relation may be one of government, or dependency, or licensing, for example. This interpretation of SP also entails a ban on any categorial change, whether 'category' refers to a syllabic constituent or to a melodic prime. Hence, this immediately rules out any operation of head switching as a grammatical possibility. Thus, in the same way that, for example, a lexically specified onset position cannot be re-defined as a rhymal complement, we shall claim that a melodic object such

as $[\alpha]$ cannot be interpreted as another object $[\underline{\alpha}]$, without falling foul of this very general constraint on phonological derivation. While there appears to be little motivation for ruling out the introduction of *additional* licensing relations during derivation, the reasons for preserving lexically established relations (and consequently, the head or dependent status of melodic primes) are compelling from the point of view of restrictiveness.

4.2 A non-uniform analysis of harmonic agreement

Leaving aside the issue of SP violation, we encounter a further difficulty with respect to head alignment and H-licensing when we consider the analysis of vowel harmony from a rather more general perspective. In broad terms, we may view harmony as some kind of agreement with respect to a melodic property across a wide domain. We shall claim, therefore, that it is not unreasonable to expect all instances of harmony to be explained in the same way, regardless of which particular melodic property happens to be active in any given case. Such an outcome is especially appealing within the context of a restrictive theory of representation, where the desire to minimize the number of possible process types is given high priority. Ideally, then, cases of rounding or palatal harmony should be captured in the same way as, for example, ATR or height harmony. By adopting a head agreement analysis, however, we encounter difficulties with many instances of harmonic alternation, as demonstrated by the Chamorro data given below.

The Philippine language Chamorro has a vowel fronting system (i.e. palatal harmony) in which the following melodic changes occur in the first syllable of a root, when that root is preceded by a front vowel.

 $\begin{array}{ll} (8) & \mathbf{u} \to \mathbf{i} \\ & \mathbf{o} \to \mathbf{e} \\ & \mathbf{a} \to \mathbf{a} \end{array}$

The examples in (9) illustrate these vowel alternations (data is taken from Kenstowicz and Kisseberth 1979). The nominal roots in (9a) are interpreted as the 'palatalized' forms in (9b) when they follow the \mathbf{i} vowel of the definite article.

(9)	a.	gumə	'house'	b.	i gimə	'the house'
		tomu	'knee'		i temu	'the knee'
		lahı	'male'		i læhı	'the male'

Recall that, under a head alignment analysis, vowels are either headless, or they are all headed by an element on the same tier (see the example shown in (6) and discussion in \$3.2 above). But whether we consider the alternating vowel of *gumə* to be headless, as in (10a), or headed, as depicted in (10b), we are unable to derive the desired output form in any straightforward way.



In order to successfully capture the effects of palatal harmony, we would most likely be forced to describe the sequence of events shown in (10c), where the delinking of [U] is followed by the spreading of the [I] element. An analysis of the same facts in terms of a mechanism akin to H-licensing proves equally inappropriate. The latter appears to have

been formulated solely as a means of describing the kind of headship agreement found in ATR harmony systems. While nothing prevents us from introducing an operation such as I-licensing for describing palatal harmony, we suggest that this can exist only in addition to, rather than in place of, a more conventional I-spreading account.

In the light of harmony systems such as Chamorro, we may return to the problem alluded to above — namely, that we have two independent ways of representing the propagation of a melodic property beyond its lexically given domain. On the one hand, we must recognize the validity of a spreading account in the context of palatal harmony cases,⁹ and on the other, we must rely on some kind of alignment or head licensing for tongue root systems. Yet the end result of these two mechanisms is essentially identical, to the extent that a melodic property is uniformly present, or **active**, throughout a given domain. In view of this functional overlap, we will now present an alternative means of representing the specification of melodic properties which, we claim, will make some advancement towards a uniform description of harmonic agreement.

5 Harmony as element activation

5.1 Introduction

Recall the strict interpretation of SP we offered in §4.1, which required that all aspects of lexical structure be preserved throughout phonological derivation. While this position allows for the possibility of structure-building operations such as the introduction of new licensing relations, it places a ban on any move which fails to leave lexical information intact. The latter effectively eliminates (i) all categorial changes, and (ii), any changes in the licensing relations established in the lexicon. The changes grouped under (i) typically involve the substitution of one representational object for another, whether 'object' refers to a prosodic category such as a syllabic constituent, or to a melodic expression such as [\underline{A}]. In order to maintain such a stance, we are forced to introduce a number of modifications to our basic view of melodic representation, particularly with regard to headship distinctions. We show how this revised approach will permit us to accept the fundamentals of head alignment, but without the potential problems associated with SP violation.

⁹Presumably, this may be extended to include other harmony types, involving *rounding* and *nasal*, for instance.

Our modified approach to melodic structure also assists in providing a unified account of harmonic agreement, thus overcoming the 'functional overlap' described in §4.2 above. We introduce the notion of element activation — a lexical instruction which specifies the melodic material that may potentially be interpreted in the phonological string. Any member of the element inventory may be selected as an activation target; and furthermore, it is proposed that a means of identifying a specific domain of activation be included as an integral part of the lexical instruction itself. We anticipate the mechanism of element activation to be sufficiently flexible to encompass a range of phonological events, including minimal lexical contrasts, cases of local assimilation, and harmonic alternation in general. As an ultimate objective, elemental activation would effectively dispense with the need to rely on spreading in the description of assimilatory, and other phenomena. In the present discussion, however, our aims are rather more modest, and we shall demonstrate the suitability of an activation approach to vowel harmony operating at the word level.

5.2 Melodic templates

We propose that the nine-vowel system of Maasai be represented as in (11):

(11)



The structure shown in (11) departs from the standard autosegmental view of representation in two respects. First, we claim that a full set of resonance elements is present within each nuclear expression, which allows all the vowels of a language to be defined with reference to the same structural configuration. Under this assumption, we propose that melodic oppositions be expressed not in terms of the presence or absence of

particular elements, but via the **activation** of elements already resident in the structure. The filled boxes in (11) show activated elements, while the shaded boxes indicate inactive melodic material. Second, we introduce the notion of **tier complement**, which has the effect of enhancing the acoustic image of its head element. In the context of the present illustration, a tier complement contributes ATRness to the expression in which it is active.

As suggested in Backley (1995), we shall assume that the vocalic inventory of a language is circumscribed by a parametrically defined configuration of melodic tiers. This follows the idea of tier division/conflation developed in, for example, KLV (1985) and Rennison (1987), whereby any elements residing on the same melodic tier are barred from co-existing within a single expression. Thus, the widespread symmetrical five-vowel system found in Spanish, for instance, must recognize a shared 'colour' tier comprising the elements [I] and [U], together with an independent [A]- or 'aperture' tier. In this way, three distinct vowel heights may be generated, while the presence of rounding in front vowels is categorically ruled out. Turning to the inventory of Maasai, we find that an identical set of conditions holds with respect to both height distinctions and the question of front-rounding. Additionally, however, the Maasai system involves opposition along another dimension, which we have described as tongue advancement or ATRness. We have already seen how the standard Element-based model employs headship properties to encode these tongue root contrasts. We have also discussed some of the shortcomings associated with such an approach, especially with regard to the issue of head switching as a non-structure-preserving event.

We argue that, by reconfiguring the headed/headless distinction in a structurally dynamic way — namely, via the postulation of a colour tier complement — the problems arising from head switching may be successfully overcome. Our proposal motivates the representation in (11) for systems like Maasai, where a tier complement (contributing ATRness in non-low vowels) is superimposed on to a basic 5-vowel configuration to yield a structure consisting of three distinct melodic tiers: the colour tier, its complement, and an aperture tier. As already mentioned, the phonetic effects of an active complement are such that the acoustic properties of its head become enhanced. This, of course, directly parallels the way that the more traditional notion of headship status affects the interpretation of an expression: if we compare [I,A] with its headless counterpart [I,A], we find headedness translating into the relative salience of the expression's colour property, palatality. As far as interpretation is concerned, then, it seems that the phonological opposition encoded in (12a) is all but identical to that given in (12b) — in other words, that the concept of tier complement is, in fact, merely a notational variant of the established headship distinction.



We aim to demonstrate, however, that there are significant benefits to be gained from adopting the structure in (12a), these advantages becoming apparent when the idea of tier complement is taken up in conjunction with the notion of element activation, to be described in §5.3 below.

It is important to note that the addition of, say, an [I-comp] to a melodic expression does not constitute any increase in the *number of tokens* of the [I] element present in the structure. In other words, a [comp] does not imply the operation of any kind of element stacking system, akin to that assumed in the standard Particle Phonology approach (Schane 1984, 1995). In the latter, a potentially unrestricted number of tokens of any given prime could be employed in order to generate a potentially unlimited set of phonological contrasts. In theory, a grammar could therefore support the unlikely opposition between the expressions (IIIA) and (IIIIA), where the additional token of [I] in the second structure.

In contrast, the proposed notion of tier complement closely reflects the head/complement relation as it is motivated and employed elsewhere in the phonology (i.e. in prosodic structure) — and indeed, elsewhere in the grammar. For example, it is maximally binary; thus, in the same way that a nuclear head may license, at most, a single complement position, a melodic prime such as [I] is similarly restricted to one complement. Furthermore, following the way in which a nuclear complement is dependent on the presence of a non-empty head position, we assume that an [I]-comp cannot be activated unless its head element is also active. This serves to highlight the asymmetric dependency which necessarily holds between a head [I] and its complement. There is ample justification, therefore, for treating a tier complement not as an additional token of an element, but rather, as a controlled means of expanding the phonological properties of its lexically specified head. By exploiting the established head-dependent relation in this way, we bypass the need to stipulate any (binary) upper limit on the number of tokens of any element present within an expression.

Let us return to some of the assumptions that have been made above. First, we began by assuming a full set of vocalic elements to be present under each nuclear position in the phonological string. Second, we have assumed the validity of a sub-segmental melodic geometry, which predicts the range of vowel contrasts that is exploited within any one system (such as the colour vs. aperture split which characterizes the canonical 5-vowel system). On the basis of these two claims, we are able to recognize a particular structural configuration, or melodic template, such as the one shown in (13) for the vowel system of Maasai. From this template we may derive the full set of vowel oppositions of the language in question.

(13)



If an element template, such as that given in (13), contains a full set of elements and resides under each nuclear slot, then it is clear that the conventional approach to melodic opposition — which relies on the presence vs. the absence of an element — is no longer appropriate for the purposes of representational distinction. Instead, the ubiquitous presence of a prime forces us to investigate an alternative means of encoding lexical contrast, which we shall express in terms of element activation. This is described below.

5.3 Element activation

As already indicated, we shall claim that an element contributes to the overall interpretation of an expression only if that element has been activated; inactive elements fail to be interpreted, and are therefore only latently present in the structure (the shaded boxes in (11) represent inactive elements). By what means, then, does an element become active? We propose that activation is essentially a lexical instruction. Thus, the melodic properties of a morpheme (which are, of course, idiosyncratic) are specified in terms of

a series of activation 'operations' occurring at different points throughout the length of the phonological string. So, the vowel in the English word *foot* is represented in the lexicon by the single instruction **ACTIVATE [U]**. On the other hand, a melodically complex expression, such as a front mid vowel, is encoded lexically by means of (at least) two simultaneous activation instructions — **ACTIVATE [I]** and **ACTIVATE [A]**. Note that a third instruction, **ACTIVATE [COMP]**, may also be involved (see (12a) above), depending on the melodic template of the language in question.

Returning to the representation of Maasai vowels given in (11), we find that the two harmonic sets, ATR and non-ATR, are structurally distinct — they are identified by an active [comp] and an inactive [comp], respectively. Accordingly, we expect the lexical specification of the vowel **i**, for example, to contain the instruction **ACTIVATE** [COMP], which is lacking in this vowel's non-ATR counterpart **I**. However, we have already remarked on a particular feature of the ATR property in Maasai, such that, whenever it is present in a morpheme, its melodic properties are extended to encompass the remaining vocalic expressions within the same word domain too. In other words, the language exhibits dominant ATR harmony. We suggest that this harmonic behaviour may be formalised by referring to the same operation **ACTIVATE** [COMP], but by ruling that, in the case of Maasai and similar harmony systems, this instruction be specified at the level of the prosodic word. Indeed, we claim that it is this word-level activation of [comp] which gives Maasai its particular harmonic characteristics.

In the light of our proposal, let us consider some examples of root-controlled harmony in this language.

(14) Focus: root-controlled harmony

a.	kI-ñorr-U	kiñorru
	1pl- <i>love</i> -extra future	'we shall love'
b.	kI-IdIm-U	kıdımu
	1pl-be able-extra future	'we shall be able'

As illustrated in (15a) and (15b), the affixes kI- (1pl prefix) and -U (extra future suffix) contain a tier complement that is inactive. This is encoded lexically in terms of the absence of any ACTIVATE [COMP] instruction.



c. k1-1d1m-u



d. ki-ñorr-u



However, when these forms are attached to an ATR root in the formation of a prosodic word, the tier complements of the affix vowels are activated, due to the presence of an active [comp] in the verb root. (More specifically, it is the *word-level* instruction to activate tier complements which brings about the harmonic agreement observed).

As demonstrated by the representations in (15c) and (15d), wide-scope activation (i.e. affecting a domain larger than that defined by a single nucleus) gives rise to the kind of agreement which has already been characterised in §3.2 as **alignment**. Following Harris and Lindsey (1995), we maintain that this notion plays an important role in the formal definition of harmony. But rather than opting for the alignment of headship status, we see

this form of structural agreement as one which requires all (or otherwise, none) of the elements on a particular tier to be active throughout a given domain. In this way, we are able to generalise our description of harmony by referring only to the notion of activation.

(16) **ACTIVATE** ' α '

Type of harmony	Alignment target
palatal harmony	[I]
rounding harmony	[U]
nasal harmony	[N]
height harmony	[A]
tongue root harmony	[comp]

Our proposals, then, are supported by the claim that element activation is applicable to any type of harmony — thus dispensing with the apparent 'functional overlap' which we described in §4.2 above.

Our example language Maasai has been analysed as one which features a dominant ATR harmony system. Having considered the effects of root-controlled harmony, let us briefly return to the case of suffix-induced harmony cited earlier. The data in (5) are repeated here.

(17) Focus: suffix-induced harmony

a.	aa-I-pErr-ie-kI	aaiperrieki
	1s-classII-split-applied-passive	'I was split with something'
b.	A-I-pErr	aiperr
	infinitive-classII-split	'to split'

The example in (17a) involves two suffixes: in *-ie* (applied) the colour tier complement is lexically active, while in *-kI* (passive) it is inactive. When both suffixes are attached to a non-ATR root, all tier complements, regardless of their lexical specification, are activated throughout the extended prosodic word domain. This effect comes about as a result of the same requirement that was stated above with respect to the case of root-to-

suffix harmony — namely, that the instruction **ACTIVATE** [COMP], which contributes to the lexical representation of the form *-ie*, is specified at the word level, and thus, affects all the nuclear expressions occurring within the scope of that domain. If no inherently ATR suffixes follow a root such as *pErr* 'split', then tier complements remain inactive.



The lexical forms of the two suffixes — one ATR, the other non-ATR — may be compared in (18a) and (18b). Then, the harmonic effects within the prosodic word domain are illustrated. The structure in (18c) shows how alignment along the tier

complement results from the word-level activation of [comp], yielding so-called ATR agreement.

In this account of Maasai harmony we have been able to describe the facts without referring to any head switching operation of the kind that is required under a head agreement analysis. Since the flipping of head/licensee status is never observed in prosodic structure, we maintain that it should similarly be ruled out at the melodic level. To this end, we have attempted to model the acquisition of headedness in terms of the alignment of tier complements, which is specified lexically as a word-level activation instruction. In this way, lexical head-complement relations are retained throughout derivation, and no new structure need be introduced which was not already present in the lexicon (since a full melodic template is assumed at all stages). In short, our proposals allow us to maintain a highly restrictive interpretation of Structure Preservation, as set out in (7) above. We claim that this, together with the benefits to be gained from a unified approach to harmonic description, which was summarized in (16), supports the postulation of activation as a feasible alternative to current analyses which employ structural operations such as spreading, head alignment, and H-licensing.¹⁰

To finish, we outline a modified approach to the well-documented facts concerning harmonic phenomena in Akan.

6 ATR harmony in Akan

For many years, the West African language Akan has been employed as a favoured source of data for studies into the mechanisms underlying tongue root harmony.¹¹ We shall assume that an approach in terms of element activation and alignment will account for the basic distributional facts and harmonic alternations, and that such an account would largely duplicate the analysis of ATR harmony already given in the case of Maasai above. For this reason, we set aside any discussion of these regular harmonic patterns, and instead, focus our attention on another feature of the Akan harmony system, the opaque behaviour of low vowels.

¹⁰At this preliminary stage, we cannot categorically rule out the need for a lexical operation which *de*activates melodic material (the case of metaphony found in certain dialects of Italian may be an appropriate instance — see Calabrese 1984). However, we predict that most apparent examples of deactivation will be accountable for in terms of prosodic conditioning.

¹¹See, for example, Stewart (1967) and Clements (1981).

(19)	Focus:	low	vowel	opacity
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a.	o-bisa-1	'he asked'	(*o-bisa-i)
b.	wa-k3ri	'he has weighed it'	(*wз-kзri)

This language employs a vowel inventory that is similar to that of Maasai (the latter is fully illustrated in (11) above). The vowel set of Akan differs from (11) only with respect to the inclusion of a tenth vowel, transcribed here as $\mathbf{3}$, the distribution of which suggests that it be identified as the ATR counterpart of the low vowel \mathbf{a} . The non-ATR low vowel \mathbf{a} is interpreted as $\mathbf{3}$ when the following two conditions are met: (i) it is not morpheme-final, and (ii), it is immediately followed by an ATR span.

A particular feature of the low vowel in Akan is it that blocks the progression of ATR agreement across a domain, as shown in (19a). In the context of our proposed model, this example is represented as follows:

(20) o-bisa-1



In order to account for the incomplete alignment — that is, the low vowel opacity — observed in this configuration, let us consider the representation itself for a possible explanation. Recall our earlier description of the notion 'tier complement' (see §5.2), where we noted the requirement that [comp] could be active only if its head element was also active. This restriction was seen to serve two purposes: first, it limits the range of contexts in which the licensing of [comp] can be sanctioned; and second, it brings the concept of 'tier complement' into line with the notion 'complement' as it is more generally employed elsewhere in the phonological vocabulary (a parallel with the complement position of a branching syllabic constituent was used to illustrate the point).

In the example *o-bisa-I* 'he asked', the low vowel contains no active colour tier, and consequently, no appropriate licensor for an active [comp]. Under this nuclear position, then, the instruction **ACTIVATE** [COMP] fails to have any effect, due to the inactive status

of the head element. In addition, however, this failure has repercussions for other vowels within the same word domain. At the particular point in the phonological string where [comp] cannot be interpreted, the span of activation effectively collapses, resulting in a breakdown in the transmission of the lexical activation instruction. From this, we are able to develop a specific characterisation of alignment in terms of an *unbroken* span of activation — a description that fully accords with the way in which 'activation' has been employed in the examples above.

(21) a. * ACTIVATE [COMP] without active head element



b. * Interruption of activation span



c. * Violation of Structure Preservation



The ill-formed configurations in (21) demonstrate how low vowel opacity remains the only grammatical outcome in the present example. While (21a) depicts the impossible situation of allowing an active [comp] with an inactive head element, the structure in (21b) highlights the necessity of recognizing a continuous span of activation for the harmonic property [comp]. This interruption within the activation domain corresponds to the 'breakdown in the transmission of the lexical activation instruction' referred to above. In (21c) we present a structure which we assume to be universally ill-formed; consequently, such a configuration must lie beyond the generative capabilities of the model. Here, the active [A] in the root-final vowel carries the burden of transmitting the lexical instruction to the rightmost nuclear position. In this case, however, the configuration requires a structure-changing operation (in which a new relation is introduced between [comp] and the aperture tier), and is ruled out in accordance with our restrictive view of SP. In conclusion, (20) must be regarded as the most satisfactory and well-formed representation, despite its incomplete alignment. Thus, the string *o-bisa-1* remains the only attested interpretation of the verb phrase in question.

Finally, let us briefly turn our attention to another feature of the low vowel in Akan — namely, its interpretation as **3** in predictable contexts. This was exemplified in (19b), which we represent as follows:

(22) wa-k3ri (*w3-k3ri) 'he has weighed it'



As we have already indicated, the distribution of the vowel transcribed here as $\mathbf{3}$ strongly suggests that it be identified as an ATR variant of the low vowel \mathbf{a} , on the grounds that (i) the two sounds appear in mutually exclusive contexts, and (ii), $\mathbf{3}$ is found only in ATR environments. However, this assumption gives rise to an immediate problem, such that the melodic template proposed for Akan explicitly rules out this possibility, as the ill-formed status of (21a) demonstrates. Instead, let us look to the precise phonetic interpretation of $\mathbf{3}$ as a means of revealing its phonological identity. Significantly, what

we find is a notable degree of variation in the way **3** is realized across different dialects of the language, typically within the [æ]-[ε]-[e] region. We claim that this instability reflects the presence of a melodically unspecified vowel — that is, a nuclear position which is interpreted in a system-specific way, in the absence of any lexically given melodic material.¹²

At first glance, this assumption appears to contradict our earlier formulation of SP, which requires all lexical information to be left intact throughout derivation. Specifically, we have a situation in which the penultimate vowel of the stem in (22) carries the lexical instruction ACTIVATE [A]; yet we claim that this position is not interpreted as the low vowel **a**, but as a melodically empty nucleus. This apparent 'loss' of the element [A] fails to provide any support for the restrictive version of SP put forward in (7). Here, we must acknowledge a grammatical conflict in which, on the one hand, the activation of [A] should be respected, and on the other, the activation of [comp] should be aligned throughout the entire prosodic word domain. Clearly, the incompatibility of these two requirements means that something must 'give'; and in the case of Akan, we find it is the influence of the **ACTIVATE** [COMP] instruction which determines the interpreted outcome. We shall argue that the medial vowel in (22) still contains a lexically active [A] (in accordance with SP), but that this element fails to be interpreted.¹³ This results from the dominant influence of ACTIVATE [COMP], which requires that *all* vocalic expressions in the domain *must* have an active tier complement. The failure of the low stem vowel to comply with this prevailing restriction leads to the non-interpretation of this expression; if [A] fails to be interpreted, then only a melodically empty position remains.

As a final remark, let us return to the examples cited in (19), repeated here as (23).

(23)	a.	o-bisa-1	'he asked'	(*o-bisa-i)
	b.	wa-k3ri	'he has weighed it'	(*wз-kзri)

¹²See Charette (1991) for a discussion of the interpretation of phonologically empty nuclei.

¹³This highlights the distinction between lexical activation and element interpretation. While activation is necessary for successful melodic interpretation, it alone does not guarantee it. Activated material can be interpreted only after other conditions (both universal and system-specific) on well-formedness have also been satisfied. The nature of such conditions is investigated in Backley (forthcoming).

Given the circumstances under which the low vowel \mathbf{a} is interpreted as $\mathbf{3}$, it is not immediately apparent how we should arrive at the attested forms given in (23). The verb root in (23a) is clearly a lexically ATR object (the high vowel belongs to the ATR set); yet in this case, the instruction to activate [A] is not overridden by the harmonizing property ACTIVATE [COMP]. Instead, the active [A] element is unaffected, and hence, interpreted successfully. Similarly, in (23b) we assume that the entire prosodic word corresponds to the domain of activation for [comp]; but once again, we find the low vowel alternant selected in the prefix: thus the form wa is observed, rather than the expected w3. This apparent anomaly finds a simple explanation in the fact that [A] always seems to be interpreted in the final nuclear position of a morpheme, regardless of whether that position falls within an ATR or a non-ATR span; in all other positions we find the a~3 alternation, as predicted. We assume that the regular absence of **3** morpheme-finally should be recognized as something to be encoded as a grammatical property of the language in question. It may be proposed, therefore, that Akan chooses the OFF setting of a parameter which controls the sanctioning of a domain-final empty nucleus (KLV 1990). If a final empty position is not licensed to occur, then the lexically defined [A] in wa and bisa cannot be suppressed, but instead, must be interpreted according to lexical instruction.

7 Summary

This discussion has identified one particular aspect of the Element Theory approach to melodic structure which, we have suggested, fails to maintain the same level of restrictiveness that is characteristic of the theory as a whole. In order to provide a satisfactory description of vowel harmony phenomena, we have shown that two independent devices must be employed — on the one hand, the conventional notion of spreading, and on the other, the idea of headship agreement. This has the effect of expanding the repertoire of possible phonological operations to include not only spreading and delinking, but also head alignment/licensing. We have argued that this move augments the model's predictive power unnecessarily, and consequently, is undesirable from the point of view of generative restrictiveness.

In an attempt to unify these two disparate mechanisms, we have motivated a melodic structure in which a full set of elements is present under each position; the primes are arranged according to a language-specific melodic template established according to parametric choice. Lexical oppositions are then encoded by means of a single instruction

ACTIVATE [α], where α is a variable over the universal set of melodic units available to the phonology. Included in this set is the object we have referred to as [comp] or 'tier complement', which represents — in a structurally dynamic way — the properties typically described in terms of melodic headship. We propose that α may be activated at different levels of the prosodic structure to give a range of different assimilatory or harmonic effects.

As the account of harmony in Akan has demonstrated, we may appropriately equate an active [comp] with the melodic property of ATRness. This allows us to collapse into a single mechanism the two independent devices formerly required in the description of, on the one hand, harmony involving resonance elements, and on the other, harmony involving tongue root properties. We have also aimed to show how a restrictive interpretation of Structure Preservation may be maintained in the context of the proposed modifications. While the present discussion has considered only cases of word-level harmonic agreement, we suggest that a key area for future research will explore the extent to which the notion of activation can be generalised to accommodate other phonological events too. By allowing lexical activation to interact with universal principles of licensing, we anticipate that the predictive power of the model will be further enhanced — to the point where we can expect to account for a range of phenomena such as local harmony, lenition, and reduplication.

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