Feature-changing Harmony in Turkana
Author(s): Manuela Noske
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Manuela Noske
University of Chicago

1. Introduction

In this paper I will analyze the vowel harmony system of Turkana, an Eastern Nilotic language spoken in northern Kenya. I will explore what consequences Turkana vowel harmony has for the theory of radical underspecification and for the treatment of opaque vowels in that framework. The aim of this paper is to provide empirical evidence against the claim that only one value (either the plus or the minus value) of a distinctive feature is present in the underlying representation. Turkana vowel harmony provides evidence that both the plus and the minus value of the harmony feature [Advanced Tongue Root] are specified underlyingly.

I will first show why both values of the feature [ATR] have to be present in the underlying representation in Turkana, and why harmony is a feature-changing process. I will then analyze the behavior of the low vowel which is opaque to [+ATR] spreading, and the behavior of high vowels which are opaque to [-ATR] spreading, using an idea which was first put forth in Cole's (1987) dissertation, namely that [-ATR] spreading is subject to the restriction that both trigger and target be linked to a single contextual feature. Since this idea can only be implemented if both values of the contextual feature are present in the representation, I will take this as further evidence against the basic assumption of radical underspecification.

2. Description of the Vowel Harmony System

Turkana has nine vowels which can be divided into two sets on the basis of the feature Advanced Tongue Root ([ATR]). The Turkana vowel system is asymmetrical since the low vowel /a/ always patterns with the [-ATR] vowels and does not have a [+ATR] counterpart. Since /a/ has a predictable value for [ATR], I will assume that this feature is redundant with the low vowel.

(1)

[+ATR]		[-ATR]	
i	u	i̲	u̲
e	o	e̲	o̲
		a̲	

In general all vowels in a word must agree in the feature [ATR]. The examples in (2) show that the [ATR] value of suffixes depends on the [ATR] category of the root. Since vowel harmony in Turkana is controlled by the root, the suffixes in (2) alternate.

(2)

[+ATR] verb roots		[-ATR] verb roots	
a̲-limw-uni	'to tell'	a̲-ze̲-u̲ni	'to choose'
a̲-gol-uni	'to close in'	a̲-do̲k-u̲ni	'to climb down'
ngi-rot-in	'road, pl.'	a̲-ide̲s-i̲[1]	'I am beating'

In some cases, however, it is the [ATR] quality of the suffix vowel which determines the quality of the root vowel. If a dominant [+ATR] suffix is added to the verb root it will surface with [+ATR] vowels, and if a dominant [-ATR] suffix is attached, the verb root will surface with [-ATR] vowels. Dominant suffixes therefore not only fail to undergo

harmony, but in addition cause the preceding vowels to harmonize. Examples of dominant suffixes are given in the first two columns in (3).

(3)

		dominant [+ATR] suffix /-e/	dominant [-ATR] suffix /-ere/[2]	alternating suffix /-UnI/
[+ATR] root	/-gol/	e-gol-e	a-gol-ere	a-gol-uni
	/-rem/	e-rem-e	a-rem-ere	a-rem-uni
[-ATR] root	/-dok/	e-dok-e	a-dok-ere	a-dok-uni
	/-gyel/	e-gyel-e	a-gyel-ere	a-gyel-uni

In these examples, the category of the root vowel is determined by the [ATR] quality of the suffix vowel. The underlying contrast between a [+ATR] and a [-ATR] root surfaces only when an alternating suffix is added to the root, as can be seen in the last column in (3). If a dominant suffix is added, the existing contrast in the root is neutralized.

For each process of ATR-harmony there exists a complementary class of opaque vowels. The low vowel /a/ blocks [+ATR] harmony, while the high vowels /i/ and /u/ block [-ATR] harmony. As already mentioned above, in roots the low vowel /a/ does not alternate, but always surfaces as [-ATR] [a]. Morpheme-internally only [-ATR] vowels precede the low vowel. In addition, roots with a low vowel in initial position always take [-ATR] prefixes. If a dominant [+ATR] suffix is added to a low vowel root, the low vowel will block spreading of the [+ATR] feature to any vowel to its left. The low vowel is therefore opaque in the vowel harmony system of Turkana.

(4) Morpheme-internally only [-ATR] vowels precede the low vowel /a/.[3]

nga-kimak	'old woman, pl.'
e-sikarangur	'molasses'

(5) Only [-ATR] vowels occur if a prefix is attached to a low vowel root.

e-kalees	'ostrich, sg.'
e-maanik	'bull, sg.'

(6) The low root vowel blocks [+ATR] suffix harmony.

a-na-ikin	'to give'	e-na-ikin-e	'way of giving'
aki-ram	'to beat'	e-ram-e	'way of beating'

High vowels, on the other hand, occur with either value of [ATR] in both root and suffix position. In contrast to the low vowel, a [-ATR] high root vowel becomes [+ATR] if followed by a dominant [+ATR] suffix. They do, however, block [-ATR] spreading. When a [-ATR] suffix is added to a [+ATR] high vowel root, the high vowel will block spreading of this feature. The high vowel and all vowels preceding it will surface as [+ATR]. High vowels are therefore opaque to [-ATR] suffix harmony, although they can undergo [-ATR] harmony in roots.

(7) [+ATR] and [-ATR] high vowels occur in roots.

aki-buk	'to pour'
aki-duk	'to build'

(8) [+ATR] high vowels block [-ATR] suffix harmony.

		dominant [+ATR] suffix /-e/	dominant [-ATR] suffix /-ɛrɛ/	alternating suffix /-UnI/
[+ATR] root	/-buk/	e-buk-e	a-buk-ɛrɛ	a-buk-uni
[-ATR] root	/-dʊk/	e-dʊk-e	a-dʊk-ɛrɛ	a-dʊk-ʊni

3. Analysis

In this section I will analyze the vowel harmony system of Turkana within the framework of radical underspecification, as outlined in Kiparsky (1981, 1982) and further developed by Archangeli (1984) and Archangeli and Pulleyblank (1986). I will show that radical underspecification needs to invoke *ad hoc* devices such as diacritic marking, feature deletion rules or extrinsic rule ordering to account for the vowel harmony system of this language. I will argue that by assuming that only one value of a distinctive feature is specified underlyingly, radical underspecification obscures an important generalization about the workings of this vowel harmony system. I will conclude by rejecting such an approach.

Archangeli (1984) presents the most thoroughly developed account of the use of underspecified feature matrices in current phonological theory. Building heavily on previous works by Chomsky and Halle (1968), Kean (1975), and Kiparsky (1981), she develops a framework in which universal markedness considerations combine with language-specific phonological rules to govern a set of minimally specified feature matrices. The underlying representation of a segment is determined by two principles: first, underlying representations include the minimal number of features necessary to distinguish the different phonemes of a language, and second, only the marked value of a distinctive feature is present underlyingly, while the unmarked value is filled in by a redundancy rule. While the first principle which excludes non-distinctive or redundant information from the underlying representation is part of almost any phonological theory, it is the second principle which distinguishes the theory of radical underspecification from most current theories of phonology. I will examine this claim of radical underspecification in more detail before turning to the vowel harmony system of Turkana.

Which feature value is specified underlyingly and which value is supplied by rule depends on universal and language-specific considerations. Archangeli (1984) assumes that every grammar is equipped with a set of universal default rules which equal the markedness conventions in SPE and which create required or preferred feature configurations. A feature configuration which is universally required is, for example, the combination of the features [+high] with [-low], while the combination of [-low] with [-round] and [-back] is preferred but not required in languages. Each universal default rule corresponds to one of these feature configurations, supplying the required or preferred value. However, the universal default rules alone cannot fill in all the missing information. An additional set of language-specific redundancy rules, the complement rules, is needed to fulfill this task. The complement rules are not part of the grammar itself, but they are formed using information about the existing universal default rules and information about the particular phonological system, such as the quality of epenthetic vowels and phonological alternations. The two sets of rules work *in tandem* to specify all the non-redundant information.

The claim that there are universal and language-specific redundancy rules which supply non-redundant feature specifications is by itself unfalsifiable. It is only of consequence if it can be shown that these rules interact in a meaningful way with the phonological rules of a language. Only if it can be shown that the absence of certain feature

specifications helps simplifying the phonological rules, is the claim that distinctive information is missing at the underlying level of any interest. In Yawelmani, for example, the fact that the feature [-round] is filled in by a redundancy rule is only of importance if the harmony rule which spreads the feature [+round] applies before the redundancy rule, making [+round] spreading a feature-filling and not a feature-changing process. If the [-round] redundancy rule applied before [+round] spreading, the latter rule would be feature-changing and there would indeed be no proof or motivation for the existence of such a redundancy rule. Instead it can be assumed that [-round] is present in the underlying representation.

The interaction between redundancy rules and phonological rules is governed by the Default Ordering Principles, the Redundancy Rule Ordering Constraint (RROC), the Elsewhere Condition, or extrinsic ordering. Two formulations of the RROC exist (Archangeli 1984, and Archangeli and Pulleyblank 1986), and I will examine each of the formulations, as well as the Default Ordering Principles, as I analyze the vowel harmony system of Turkana, showing that neither the old version of the RROC, nor the Default Ordering Principles together with the revised form of the RROC make the correct predictions for this language.

In (9) I have given the surface specifications of the Turkana vowels, using the features [ATR], [high], [low] and [round].

(9)

	i	e	o	u	ɨ	ɛ	a	ɔ	ʊ
high	+	-	-	+	+	-	-	-	+
round	-	-	+	+	-	-	-	+	+
low	-	-	-	-	-	-	+	-	-
ATR	+	+	+	+	-	-	-	-	-

Assuming with Archangeli and Pulleyblank (1986) that there is a set of universal default rules which supplies the feature values [-ATR], [+high], [-back], and [-low], only the opposite values are specified underlyingly. For purposes of exposition I will ignore the default rules assigning the feature values [+high], [-low] etc., and concentrate my analysis on the interaction of the rules of vowel harmony with the rule that supplies the redundant [-ATR] value.

(10)

	i	e	o	u	ɨ	ɛ	a	ɔ	ʊ
high		-	-			-		-	
back			+	+				+	+
low							+		
ATR	+	+	+	+					

The harmony rule in (11) spreads the feature value [+ATR] to all vowels which do not bear a specification for this feature. If no [+ATR] specification is present, the default rule in (12) will fill in the [-ATR] value. I assume that spreading is bidirectional.

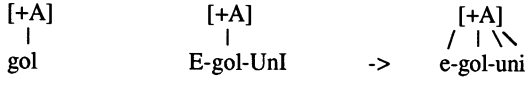
(11) [+ATR] spreading:

(bidirectional)

(12) Complement [-ATR] assignment: [ ] -> [-ATR]

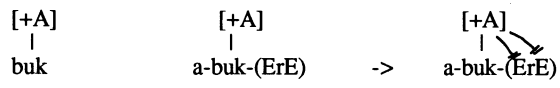
An example of [+ATR] spreading is given in (13).

(13)



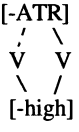
The question is how the behavior of the [-ATR] suffixes can be analyzed. Assuming that only [+ATR] is specified underlyingly, we have to explain why [+ATR] does not spread to the suffix vowels in the second column in (8). Since mid vowels can regularly undergo harmony in roots, it is impossible to formulate a configuration constraint which prohibits the association of the feature [+ATR] with the feature [-high]. For the same reason a positive feature constraint which states that [+ATR] can only co-occur with [+high] is excluded. The only solution is therefore to mark this suffix diacritically for not undergoing [+ATR] harmony.

(14) Invariant [-ATR] suffix attached to a [+ATR] root.



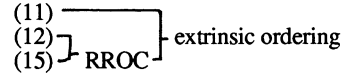
Furthermore, we have to account for the spreading of the feature [-ATR] to the root vowels in the second column in (3). Since [-ATR] spreads, a rule of regressive [-ATR] spreading needs to be formulated, which applies only to mid vowels. I will assume that [-ATR] spreading in (15) is feature-changing.

(15) [-ATR] spreading:



If [-ATR] is absent from the underlying representation, then the redundancy rule in (12) which assigns the value [-ATR] has to be ordered prior to [-ATR] spreading by virtue of the RROC. Informally, the RROC as formulated in Archangeli (1984: 85) states that if a rule refers to a specific feature value in its structural description, a redundancy rule which fills in the feature value is automatically ordered before that rule. Since Archangeli (1984) assumes that redundancy rules apply as late as possible, this constraint is to make sure that all the relevant information is available in the representation when the phonological rules apply. Complement [-ATR] assignment is therefore ordered prior to [-ATR] spreading by the RROC. The rules are now ordered in such a way that [+ATR] spreading applies first, followed by complement [-ATR] assignment and [-ATR] spreading. Note, however, that the Elsewhere Condition should order the more restricted rule of [-ATR] spreading before [+ATR] spreading. [+ATR] spreading can only apply first, followed by the redundancy rule in (12) and [-ATR] spreading, if these rules are extrinsically ordered.

(16) Possible order of application:



Since extrinsic rule ordering is incompatible with the spirit of radical underspecification and undesirable on independent grounds, we should search for an alternative solution which makes use of the restrictive principles of rule ordering that radical underspecification claims to adhere to.

A more appealing solution would be to order [-ATR] spreading before [+ATR] spreading by the Elsewhere Condition. The redundancy rule in (12) would then apply before [-ATR] spreading by virtue of the RROC, filling in the feature value [-ATR]. The undesirable consequences of this approach should be clear: if the redundancy rule in (12) applied before [+ATR] spreading, then it would bleed the application of [+ATR] spreading,

by assigning the value [-ATR] to all unspecified vowels. Ordering by the Elsewhere Condition and the RROC therefore gives the wrong output.

(17) Possible order of application: (12), (15) ordered by RROC; (12) bleeds (11); (11) ordered by Elsewhere Condition

Instead we would like the redundancy rule to hold back until after [+ATR] spreading has applied. The desired solution in which the redundancy rule applies last, and the rule of [-ATR] spreading applies before [+ATR] spreading requires a special redundancy rule which fills in the feature value [-ATR] only to the suffixes in (18).

(18) [ ] -> [-ATR] suffixes /et/, /ere/, /ari/

(19) Possible order of application: (18), (15), (11), (12) ordered by Elsewhere Condition

This solution has the advantage over the solution in (16) that we do not need to make [+ATR] spreading sensitive to diacritic markings and that we do not have to order [+ATR] and [-ATR] spreading extrinsically. But note that in this solution the RROC has absolutely no function. Since the last approach is the lesser of two evils I will prefer it over the solution in (16). The only question that remains is, should we allow the application of an idiosyncratic redundancy rule as in (18)? On the one hand, the existence of an idiosyncratic redundancy rule increases the power of the theory beyond the desirable limits. On the other hand, the existence of redundancy rules which apply before phonological rules cannot be verified. I will therefore take the arguments presented here as evidence for the claim that [-ATR] is indeed present in the underlying representation. However, before making such a strong claim I will examine whether the revised version of the RROC together with the Default Ordering Principles helps to remedy the situation.

Archangeli and Pulleyblank (1986) distinguish between two kinds of redundancy rules: those which assign non-distinctive feature values and which apply as late as possible (first Default Ordering Principle), and those which assign distinctive feature values and which apply early, before the phonological rules of a language (second Default Ordering Principle). It is the task of the revised RROC to insure that the redundancy rules which supply distinctive feature values are assigned to the first component of the grammar in which reference to that feature value is made, i.e., the revised RROC guarantees that distinctive feature values are assigned to the same stratum as the phonological rules which manipulate them. This formulation of the RROC no longer makes any predictions about the absolute ordering of redundancy rules and phonological rules, but simply requires that a redundancy rule provides a distinctive feature value in the same stratum, although not necessarily before, the rule which makes reference to that feature. It is the task of the second Default Ordering Principle to make sure that the redundancy rules apply before the phonological rules of a language. The revised RROC assigns the redundancy rule so to say to the right slot, while the second Default Ordering Principle determines when the redundancy rule applies.

In some cases, however, a redundancy rule can apply after a phonological rule, namely if the phonological rule and the redundancy rule are in an Elsewhere relationship. Archangeli (1984:83) interprets the Elsewhere Condition in such a way that if a language-particular rule supplies a feature value for some unspecified feature, then the language-specific rule has precedence over the redundancy rule. In Yawelmani, for example, the harmony rule which supplies the feature value [+round] and the redundancy rule which supplies the feature value [-round] are ordered by the Elsewhere Condition in such a way,

that the language-specific rule applies before the redundancy rule. If only the second Default Principle applied, then the redundancy rule would apply before [+round] spreading, and thereby bleed its application.

It is by adopting the second Default Ordering Principle that radical underspecification becomes significantly less radical. By dividing redundancy rules into those which apply late and provide non-distinctive, redundant information, and those which apply early and supply distinctive feature values, radical underspecification comes remarkably close to what most theories assume about the structure of phonology. The only difference is that radical underspecification allows some redundancy rules to apply late, after the phonological rules of a language, and that it invokes the Elsewhere Condition to achieve this goal. The assumptions in Archangeli and Pulleyblank (1986) are in direct opposition to earlier claims about the application and ordering of redundancy rules and phonological rules. Do these revisions help to account for the ordering paradox in Turkana?

In the 1986 version of radical underspecification, the redundancy rule in (12) applies in the same stratum, but not necessarily before the rule of [-ATR] spreading by virtue of the revised RROC. While [-ATR] spreading is ordered before [+ATR] spreading by the Elsewhere Condition, the [-ATR] redundancy rule applies after [+ATR] spreading by the same principle. However, this is still no solution to our problem. If the rule in (15) spreads the feature value [-ATR], and if [-ATR] is inserted only after [+ATR] spreading, then where does this feature specification come from? If the feature value [-ATR] spreads then it must either be inserted by a special redundancy rule (solution (19)), or it must be present in the underlying representation. For reasons outlined above, I will choose the second option and assume that [-ATR] is specified underlyingly. We can conclude that even with the new version of the RROC and the Default Ordering Principles the ordering paradox in Turkana cannot be solved.[4]

4. Opacity

In this section I will discuss how the opacity of the low vowel /a/ on the one hand, and the high vowels /i/ and /u/ on the other hand, can be analyzed. There are various suggestions as to how opaque vowels in harmony systems should be treated. It is frequently assumed that opaque vowels bear a specification for the opposite value of the harmony feature before spreading applies. Opaque vowels can either be underlyingly specified for the harmony feature or receive such a specification by rule. In Turkana we could say that the low vowel is underlyingly specified as [-ATR], and that spreading of the feature [+ATR] is blocked by virtue of the Well-formedness Condition which prohibits the crossing of association lines.

(20) * [-A] [+A]

V V V

However, if we analyze Turkana vowel harmony within radical underspecification the low vowel cannot be specified as [-ATR] underlyingly, since only one value, the spreading value, is present in the underlying representation. Similarly, an approach in which /a/ receives a [-ATR] specification by rule before [+ATR] spreading is problematic, since [-ATR] is redundant with the low vowel and should therefore be assigned in the latest stratum of the phonology. Positing such an idiosyncratic redundancy rule would weaken the theory of radical underspecification considerably. Moreover, in this solution the property of blocking does not derive from the phonological representation as such, but is a primitive feature of the system. Any vowel and not only the low vowel can be specified by rule for the opposite value of the harmony feature.

In addition, there is language-specific evidence that the low vowel is unspecified for [ATR] when [+ATR] spreading applies. In suffixes /a/ is subject to a morpho-phonological rule which raises it to a mid back vowel if it is preceded by a [+ATR] root. The [+ATR] feature subsequently spreads to the raised vowel which surfaces as a [+ATR] mid back vowel [o].[5]

(21)	a-buk-okin	'to pour for s.o.'	a-duk-akin	'to build for s.o.'
	a-gol-okin	'to close for s.o.'	a-dok-akin	'to climb for s.o.'
	a-rem-okin	'to spear for s.o.'	a-gyel-akin	'to buy for s.o.'

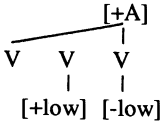
If we assume that /a/ is unspecified underlyingly, then the rule in question only needs to change the height specification of the low vowel. If, on the other hand, we assume that the low vowel is [-ATR] underlyingly, then the [-ATR] specification has to be changed into [+ATR], in addition to a change in vowel height. The simplest solution is therefore to assume that /a/ is not specified for [-ATR] underlyingly.

Instead, the opacity of the low vowel can be expressed with the help of a configuration constraint, which prohibits the association of the feature [+ATR] with the low vowel.

(22) * [+A]
|
V
|
[+low]

I will assume that Turkana has a constraint which keeps a vowel from being skipped in the association process. Spreading is blocked if the spreading feature cannot associate with every vowel in the word. The existence of such a constraint is enough to explain the opacity of /a/.

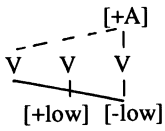
(23) *



Cole (1987) argues that we need a third account of opaque vowels. She provides examples in which the opaque vowel does not have a specification for the harmony feature, and yet blocks spreading. Since for one reason or another no configuration constraint can be formulated to account for these cases, she assumes that harmony in these languages is dependent on the presence of a contextual feature. A harmony feature can only spread if trigger and target are linked to an identical contextual feature. In Yawelmani, for example, [+round] spreads only if trigger and target share a specification for [ßhigh]. Spreading is blocked if trigger and target are not linked to the same feature. In this account any vowel which is specified for the opposite value of the contextual feature blocks harmony, since trigger and target are not associated with one and the same feature. Blocking in these cases results from a violation of the Linked Structure Constraint.

To derive the blocking effect of /a/ in Turkana, [+ATR] spreading can be made dependent on the feature [-low]. If we assume that [+ATR] spreads on the feature [-low], then the low vowel would block [+ATR] spreading by virtue of being specified as [+low].

(24) *

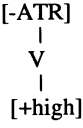


Although this is an appealing analysis, it has its shortcomings. Making [+ATR] spreading dependent on the feature [-low] forces us to assume that all vowels, except the low vowel, are specified for this feature value before harmony applies. [-low] is, however, a redundant specification in high vowels. There is no reason to assume that this value is filled in during the lexical component of the grammar. The disadvantage of this approach is that it makes harmony dependent on a redundant feature value. I therefore conclude that the blocking property of the low vowel is best explained if we assume that Turkana has a configuration filter as in (22) which prohibits the association of the feature [+ATR] with the feature [+low].

In contrast, the behavior of high vowels in Turkana lends strong support to the idea that blocking results from a violation of the Linked Structure Constraint. What makes the behavior of the high vowels in Turkana interesting is that they represent a case of unpredictable neutrality. In most languages neutral vowels are recruited from the class of vowels which do not have a harmonic counterpart. The low vowel /a/ in Turkana, for example, is predictably neutral, since it is the only vowel in the system which lacks a [+ATR] counterpart. The high vowels /i/ and /u/, on the other hand, can occur with both [ATR] specifications, and their neutrality is therefore unpredictable. Their behavior can neither be accounted for with the help of a configuration constraint nor by assuming that they are underlyingly linked to the opposite value of the spreading feature.

Although high vowels in roots are specified as [+ATR], the [+ATR] specification cannot be the cause of their opacity, since [-ATR] spreading is a feature-changing process. Not only high vowels, but also mid vowels are specified as [+ATR], when [-ATR] spreading applies. But while [-ATR] spreading affects mid vowels, it is blocked by high vowels. The blocking effect of high vowels can therefore not result from their [+ATR] specification. Note also that it is impossible to formulate a configuration constraint which prohibits the association of [-ATR] with these vowels, since high vowels occur with both specifications of [ATR] in roots and suffixes.

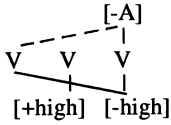
(25)



is a possible configuration

Since it is not the [+ATR] specification that explains the blocking behavior of high vowels, [-ATR] spreading must be dependent on a contextual feature. If we assume that [-ATR] spreads on the feature [-high], then any segment which is specified as [+high] will block [-ATR] spreading.

(26) *



Note that of the three explanations of opacity, this is the only possible account of the blocking behavior of the high vowels in Turkana. And note further that this solution requires that both values of the feature [high] are present when [-ATR] spreading applies.

If we assume that only [-high] is specified in the underlying representation, then the redundancy rule which fills in [+high] must apply before
[-ATR] spreading. However, if [+high] is inserted before [-ATR] spreading, what evidence is there that [+high] was ever absent from the underlying representation? Again, since the claim that the feature value [+high] is absent from the underlying representation cannot be falsified, and since the feature value [+high] crucially needs to be present before [-ATR] spreading applies, I will assume that [+high] is indeed specified in the underlying representation of Turkana. I will furthermore conclude that only in cases of unpredictable neutrality can the Linked Structure Constraint be invoked as an explanation of opacity. In cases in which the opaque vowel does not have a harmonic counterpart, a configuration constraint has to be assumed, if we want to avoid the negative consequences of making autosegmental spreading dependent on a redundant feature value.

5. Conclusion

In this paper I have shown that both values of the feature [ATR] need to be present in underlying representation of Turkana. The claim that only [+ATR] is present underlyingly forces us to assume that a language-specific redundancy rule operates in this language, which supplies a subgroup of morphemes with the feature value [-ATR]. But if we acknowledge the existence of such rules, then the claim of radical underspecification that redundancy rules "do not exhibit language-specific idiosyncracies of form and function" (Archangeli and Pulleyblank 1986: 8) is false. The ordering paradox in Turkana forces us to the conclusion that [-ATR] is present in the underlying representation. Since no evidence can be found for the existence of early redundancy rules and since their existence can only be motivated on theory-internal grounds, I will conclude that, unless there is evidence to the contrary, both values of a distinctive feature are present underlyingly.

The examples presented by Archangeli and Pulleyblank (1986) seem to suggest that languages may optionally specify only one value of a distinctive feature, while the opposite value is filled in by a late redundancy rule. However, acknowledging the possibility that some languages may be only partially specified at the underlying level does not force us to conclude that only one value of every distinctive feature is present in the underlying representation of every existing language. Empirical evidence for such a claim still needs to be brought forth.

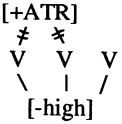
Notes

[1]The prefix /a-/ denoting first person singular and the root initial vowels /i/ are contracted to a mid front vowel, cf. [edesi] 'I am beating'.

[2]The suffixes /-et/, /-ere/, and /-ari/ show the same behavior.

[3]I do not have any examples of a trisyllabic morpheme with a [-ATR] vowel in initial position, followed by a low vowel and a [+ATR] vowel. Hence all examples in (4) consists of [-ATR] vowels only.

[4]Another solution to the phenomenon described here is to make the suffixes in (3) exceptions to [+ATR] spreading, and to formulate a rule which deletes the [+ATR] specification of a root vowel in front of these suffixes. I reject such an approach for two reasons: first there is no natural way of expressing such a rule, and second it would make any theory of phonology unconstrained. In a rule such as the following

(i)


there is no connection between the trigger and the target of the process. Rule (i) obscures the fact that we are dealing with a common phonological process: regressive assimilation between vowels of the same height. A rule in which [+ATR] is deleted in front of a [+anterior] consonant would be just as plausible. Second, permitting rules such as in (i) amounts to making reference to a feature value, without that that value is explicitly mentioned in the rule. I will not discuss here what consequences the integration of such rules would have for the theory of phonology.

[5]Not all low vowels in suffixes surface as a [+ATR] mid back vowel [o]. The low vowel in the suffix /-ari/, which denotes a motion away from the speaker, surfaces as a [-ATR] mid back vowel [o̲]. The [-ATR] specification of this suffix spreads backwards to the root, cf. /a-gol-ari/ -> [agolo̲r] 'to close out'.

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