

An alignment-based account of vowel harmony in Ifẹ Yoruba¹

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Abstract

Most recent research on Yoruba vowel harmony has focused on Standard Yoruba (Benue-Congo/Nigeria). This inquiry is extended to consider Ifẹ a central Yoruba dialect spoken in Ile-Ifẹ Nigeria. Low and mid vowels in Ifẹ exhibit the same harmonic patterns attested in Standard Yoruba. However, high vowels display harmonic differences in these two dialects. I show that while the analysis of these divergences is straightforward in Pulleyblank's (1996) framework, it is problematic for Bakovic's (2000) analysis.

1. Introduction

Most recent work on Yoruba vowel harmony has focused on Standard Yoruba (SY) (Archangeli and Pulleyblank 1989, 1994, Pulleyblank 1996, Bakovic! 2000). This paper extends this work to consider Ifẹ (IY), a central Yoruba dialect. IY shares some harmonic properties with SY. For example, as in SY, low vowels are invariably retracted (a, *ə) and high vowels are invariably advanced (i, *ɪ), but mid vowels are variable harmonically (e/o or ε/ɔ). This variability is dependent on the harmonic specification of a root. If a root has a retraction feature, cooccurring mid vowels are retracted; if, on the other hand, a root has an advanced feature, cooccurring vowels are advanced. Furthermore, IY has the same distribution of pre-low and post-low mid vowels as SY; that is, mid vowels preceding a low vowel always surface as retracted (e.g., **èta** 'three' ***èta**) and those occurring after a low vowel are either advanced (**ate** 'hat') or retracted (**àtè** 'saltless food').

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Aside from these similarities, SY and IY exhibit important harmonic differences involving high vowels. First, in IY unlike in SY, a mid vowel preceding a high vowel can only be advanced, not retracted (e.g., **èbi** ‘guilt’ ***èbi**). Second, in a mid-high-mid sequence, mid vowels are uniformly advanced or retracted (e.g., **èbúté** ‘quay,’ **èlùbó** ‘yam flour’); on the other hand, the SY-type scenario is impossible; that is, vowel sequences such as [e/o...i/u...ɛ/ɔ] are unattested within a root (***èlùbó**). Third, in a mid-high-low sequence, the initial mid vowel is always retracted like the final low vowel; initial advanced mid vowels cannot ever appear before a high vowel in this context (e.g., **òsùpá** ‘moon’ ***osùpá**). The second and third properties show one significant distinction between SY and IY: in SY, medial high vowels are opaque to the transmission of retraction whereas in IY, they are transparent.

There are two issues related to the differences outlined above, which I will address in this paper. The first is why a retracted mid vowel may appear before a final high vowel in SY (**èbi** ‘guilt’) and not in IY (**èbi** ‘guilt’). The second concerns how to characterize the behavior of medial high vowels in the two dialects: opacity in SY and transparency in IY. In addressing these issues, I will consider two existing analysis of SY, Pulleyblank’s (1996) alignment-based account and Baković’s (2000) stem control analysis, and show that only an alignment-based account can explain observed cross-dialectal patterns without making incorrect predictions.

The remaining discussion proceeds as follows. Section 2 presents the theoretical assumptions. Section 3 presents data which are harmonically alike in SY and IY – data involving mid and low vowels. Section 4 presents data illustrating the differences – forms involving high vowels; representational issues such as (1) the OCP and multiple retraction specifications, and (2) the classical pre-Optimality analysis of transparency – transparency by gapping are also addressed. Section 5 compares the present analysis with an alternative account, and section 6 concludes the paper.

2. Theoretical assumptions

Archangeli and Pulleyblank (1994) introduce the basic tenets of grounding theory, a theory that regulates the well-formedness of feature combination in tongue root harmonic systems. The constraints governing the cooccurrence of tongue height (high and low) and tongue root values are given below.

- (1) Grounding constraints regulating the well-formedness of high and low vowels:
HI/ATR²: If HIGH then ATR.

2. The following abbreviations are used: ATR Advanced Tongue Root, ALIGNL Align Left, ALIGNR Align Right, DEP dependency, HI high (vowel height), IY Ife Yoruba, LO low (vowel

LO/RTR: If LOW then RTR.

HI/ATR expresses the optimal enhancement relation between highness and advancement while LO/RTR expresses the optimal enhancement relation between lowness and retraction. In many cases, as in the IY case to be presented, antagonistic combinations such as retraction plus highness and advancement plus lowness are rejected. Thus, even if an underlying representation containing an ungrounded combination were posited, it would never surface as the grounding constraints would enforce the insertion of an appropriate feature – ATR or RTR – to satisfy the grounding requirements. In Optimality Theory (OT) (Prince and Smolensky 1993), the overriding effect of dominant constraints is phrased in terms of constraint ranking: in this case, the satisfaction of a grounding constraint takes precedence over the satisfaction of the constraint banning insertion (which is defined below in 2). Candidate outputs are then generated by a set of universal operations (Gen) and are evaluated against the established ranking. The candidate that best satisfies the constraints is selected as the actual output, the optimal form.

It is generally assumed that morphemes may have a lexical ATR or RTR (Clements 1981, Archangeli and Pulleyblank 1994, etc.).³ In Optimality Theory, the retention of a lexically specified harmonic feature is guaranteed by MAX (McCarthy and Prince 1995), a faithfulness constraint. Once a feature has been associated to an F-bearing anchor, MAXPATH prohibits the delinking of that feature. As for non-lexical features and associations, their random insertion is regulated by DEP and DEPPATH (Itô, Mester and Pagett 1995, McCarthy 1993, Pulleyblank 1996, among others). Relevant MAX and DEP constraint are defined, as follows.

- (2) Faithfulness constraints:
- | | |
|-------------|--|
| MAXATR: | Any root value of ATR in the input must have a correspondent in the output. |
| MAXRTR: | Any root value of RTR in the input must have a correspondent in the output. |
| DEPATR: | Any root value of ATR in the output must have a correspondent in the input. |
| DEPRTR: | Any root value of RTR in the output must have a correspondent in the input. |
| MAXPATHATR: | Any input path between ATR and an anchor must have a correspondent path in the output. |
| MAXPATHRTR: | Any input path between RTR and an anchor must have a correspondent path in the output. |

height), MAX Maximality, OCP Obligatory Contour Principle, OT Optimality Theory, RT root, RTR Retracted Tongue Root, SY Standard Yoruba. In the Yoruba examples Mid tone is expressed by the absence of a tone mark on the vowel.

3. See Archangeli and Pulleyblank (1994) and Pulleyblank (1996) for accounts involving inputs devoid of tongue root specifications.

- DEPPATHATR: Any output path between ATR and an anchor must have a correspondent path in the input.
- DEPPATHRTR: Any output path between RTR and an anchor must have a correspondent path in the input.

Apart from faithfulness, alignment is also crucial. I follow previous work in vowel harmony phonology in assuming that alignment produces harmony (Kirchner 1993a, Smolensky 1993, Pulleyblank 1993, 1996, Cole and Kisserbeth 1994, Akinlabi 1994, 1995, 1996, Leitch 1996). For a process like tongue root vowel harmony, alignment requires that the edges of a harmonic feature be aligned with those of a given phonological or morphological domain. For instance, in SY, the domain of harmony could be the root or the word.⁴ To achieve harmony in the root, for example, any harmonic feature (RTR or ATR) specification must be aligned with the left and right edges.

- (3) Alignment:
- ALIGNRIGHT-RT: The right edge of an RTR or ATR span is aligned with the right edge of a root. (abbreviation: ALIGNR-RT)
- ALIGNLEFT-RT: The left edge of an RTR or ATR span is aligned with the left edge of a root. (abbreviation: ALIGNL-RT)

Total harmony within a root is achieved by ranking ALIGNL-RT and ALIGNR-RT above DEPPATHRTR (for roots with RTR) and DEPPATHATR (for roots with ATR). Based on this ranking, any form in which RTR or ATR is partially realized would be suboptimal: the dominance of alignment must result in complete harmony. On the other hand, if alignment is dominated by grounding, partial harmony is expected.

Finally, a couple of assumptions are vital, based on the pioneering work of Archangeli and Pulleyblank (1989, 1994) on Yoruba vowel harmony. First, I assume that RTR is the dominant harmonic value in Yoruba; ATR is the recessive value. In the spirit of Optimality Theory, I assume full specification of features and derive the dominant-recessive property through ranking: the parsing of the dominant feature takes precedence over parsing of the recessive feature (MAXRTR >> MAXATR). Extending the dominant-recessive property to other faithfulness constraints means that DEPRTR dominates DEPATR and DEPPATHRTR dominates DEPPATHATR. Second, I assume that the directionality of harmonic association and spreading is from right-to-left. In the following section, the facts of IY vowel harmony are presented and compared with those of SY. Observed similarities and differences are then shown to follow from the interaction of grounding, faithfulness, and alignment.

4. Since the cases to be presented involve only roots, I take the root to be the domain of harmony.

3. Harmonic similarities in Standard and Ife Yoruba

The oral vowel system of IY is exactly like that of SY: both dialects have seven oral vowels split into an advanced set and a retracted set (Omisore 1989):⁵

- (4) Advanced: [i u e o] Retracted: [ɛ a ɔ]

In the following subsections, attested vowel cooccurrence patterns are described and analyzed using the constraints motivated in section 2.

3.1. Forms with mid vowels: Uninterrupted harmony

As in SY, mid vowels within the same morpheme harmonize completely in IY; that is, mid vowels of the same set co-occur and those of a different set do not (Awobuluyi 1967, Bamgboṣe 1967, Archangeli and Pulleyblank 1989), as depicted in (5):

- (5) Cooccurring mid vowels are completely advanced or retracted in SY and IY:
- | Advanced | | Retracted | |
|---|----------------|---------------------------|--------------------|
| oko | ‘farm’ | ɔko | ‘husband’ |
| ɔye ⁶ | ‘proverb’ | ɛdɔ | ‘liver’ |
| ɔgèdè | ‘incantations’ | ɛgèdè | ‘banana, plantain’ |
| ehoro | ‘rabbit’ | ɛrɔrɔ ⁷ | ‘type of bag’ |
| Unattested: * oko , * ɔroro | | | |

The analysis of the above forms is quite straightforward. Following Pulleyblank’s (1996) analysis of comparable data in SY, complete harmony, exemplified by (5), is analyzed as resulting from the interaction of faithfulness and alignment. For a root with RTR specification, high-ranking MAXRTR compels the association of a lexical retraction feature; in addition, satisfaction of two alignment constraints, ALIGNL-RT and ALIGNR-RT force the realization of RTR throughout the root. DEPPATHRTR, on the other hand, is low in ranking so that the transmission of harmony from one edge to another can proceed without interruption. The

5. According to Ogunṣina (1972) and Omisore (1989), both SY and IY also have the same nasal vowels [ĩ ã ũ]. The consonantal inventory of the two dialects is however different. First, the alveolar fricative and the palato-alveolar fricative are distinct sounds in SY while in IY only the alveolar fricative is attested, serving as cognate for SY [s] and [ʃ]. Secondly, the equivalent of SY labial-velar glide [w] in IY is a voiced velar fricative.

6. In SY, this form is [ɔwe].

7. This is an IY form, which is not used in the standard dialect. The crucial point here is that cooccurring vowels are permissible in the two dialects.

following tableau shows the interaction of these constraints in the choice of the output of ɔkɔ ‘husband’.⁸

- (6) SY and IY retracted mid vowels: uninterrupted harmony by parsing and alignment
MAXRTR, ALIGNR-RT, ALIGNL-RT >> DEPPATHRTR

R /OkO/ ‘hus- band’	MAXRTR	ALIGNR-RT	ALIGNL-RT	DEPPATHRTR
☞ a. R ^ ɔkɔ				**
b. A ^ oko	*!			
c. R A ɔkɔ		*!		*
d. A R okɔ			*!	*

The optimal form, (6a), provides support for the established ranking: to derive a fully harmonic form, MAXRTR and the two alignment constraints must be obeyed at the expense of DEPPATHRTR. The non-optimal forms in (6b–d) are ruled out for failing to parse or align RTR appropriately.

Where a root with mid vowels has an ATR specification, MAXATR forces the association of the input harmonic feature and satisfaction of the two alignment constraints makes it possible for ATR to surface throughout the domain of harmony.⁹

8. In all the tableaux, the following conventions are adopted. R represents RTR and A represents ATR. The left to right order of the constraints illustrates their relative ranking, with a dotted line separating unranked constraints, and a solid line separating crucially ranked constraints. Constraint violation is indicated by an asterisk and an exclamation mark following an asterisk shows a fatal violation of a given constraint by a candidate. The optimal candidate is indicated by a pointing finger.

9. Alternatively, following Archangeli and Pulleyblank (1989, 1994), one may assume that the input representation of /oko/ is devoid of tongue root specifications. Because such forms surface as advanced, they must acquire ATR through insertion. To ensure that retraction is not inserted in this context, DEPRTR must be ranked over DEPATR.

- (7) SY and IY advanced mid vowels: uninterrupted harmony by parsing and alignment
 MAXATR, ALIGNR-RT, ALIGNL-RT >> DEPPATHATR

A /OkO/ 'farm'	MAXRTR	ALIGNR-RT	ALIGNL-RT	DEPPATATR
a. A \wedge oko				**
b. R \wedge oko	*!			
c. A R oko		*!		*
d. R A oko			*!	*

Having shown that harmony in mid-mid sequences is unimpeded, in subsequent sections, cases involving low and high vowels are examined. Unlike mid vowels which are either advanced or retracted, high and low vowels do not vary in harmonic values in SY and IY. Low vowels are consistently retracted and high vowels are systematically advanced. These properties cause disruptions in the pattern of harmony, as we will see in the following sections.

3.2. *Forms with low vowels: Grounding and leftward alignment effects*

As mentioned earlier, low vowels are systematically retracted; advanced forms are impermissible in both SY and IY, as shown below.

- (8) Low vowels are invariably retracted
 SY IY
wá **yá** 'come'
rà **rà** 'buy'
abà **abà** 'farmhouse'
ata **ata** 'pepper'
 Unattested: *tə, *ədə

Following the proposal advanced in Archangeli and Pulleyblank (1994), the required retraction of low vowels can be attributed to the grounding constraint, LO/RTR, which sanctions the combination of lowness and retraction. In contrast, the ungrounded combination, lowness and advancement, is impossible in Yoruba. To account for the impossible combination, LO/RTR must dominate DEPRTR so that a low vowel will always surface as retracted, irrespective of the actual input.

- (11) LO/RTR, ALIGNR-RT, MAXRTR >> ALIGNL-RT, DEPRTR¹⁰ >> DEPATR¹¹

The ranking in (11) ensures that roots with mid-low sequences result in harmonically retracted forms. The presence of a root-final low vowel forces the appearance of a retraction feature even if an RTR is not posited underlyingly. If the root has a retraction feature, it is parsed and spread leftward, as in (12d), the optimal candidate:

- (12) SY and IY Mid-low sequences with a lexical RTR

	R /ObA/ 'king'	LO/ RTR	ALIGNR- RT	MAX RTR	ALIGNL- RT	DEP RTR	DEP ATR
a.	A ^ obə	*!		*			*
b.	R A ɔ b ə	*!	*				*
c.	A R o b a				*!		*
d.	R ^ ɔ b a						

On the other hand, if the root contains an ATR feature, LO/RTR would prevent the feature from appearing on the final low vowel (e.g., *e...ə). One might expect the advanced feature to appear on the pre-low mid vowel (e.g., e...a). However, this expectation is not fulfilled: a retraction feature must spread to a preceding non-high vowel (ɛ...a). This is one crucial difference between low and high vowels in SY – final low vowels always propagate retraction to preceding non-high vowels whereas final high vowels do not always induce the transmission of advancement to preceding mid vowels (**ebi** or **èbi**). Following Archangeli and Pulleyblank (1989, 1994), this shows that RTR is the dominant feature in Yoruba; ATR is the recessive feature. In ranking terms, this means that MAXRTR dominates MAXATR. The following tableau shows that MAXATR is violable:

10. Although ALIGNR-RT/MXRTR and ALIGNL-RT/DEPRTR are not crucially ranked at this point, the crucial ranking of these constraints will derive the different high vowel patterns – the focus of section 4.

11. DEPATR is ranked below DEPRTR because insertion of the dominant RTR feature is worse than insertion of the recessive ATR feature. See section 4 for detailed motivation for this ranking.

(13) SY and IY Mid-low sequences with a lexical ATR

	A /ObA/ 'king'	LO/ RTR	ALIGNR- RT	MAX RTR	ALIGNL- RT	DEP RTR	DEP ATR
a.	$\begin{array}{c} \text{A} \\ \wedge \\ \text{ob}\text{ə} \end{array}$	*!		*			*
b.	$\begin{array}{cc} \text{A} & \text{R} \\ & \\ \text{ob} & \text{a} \end{array}$		*!				*
c.	$\begin{array}{cc} \text{R} & \text{A} \\ & \\ \text{ɔb} & \text{ə} \end{array}$				*!		*
d.	$\begin{array}{c} \text{R} \\ \wedge \\ \text{ɔba} \end{array}$						

Candidates (a) and (c) are ruled out by grounding. Candidate (b) fails on two grounds – first, the root ATR is not at the right edge (an ALIGNR-RT violation) and second, the LO/RTR-induced inserted retraction specification does not spread leftward, creating a disharmonic sequence. Candidate (d) is optimal in spite of the fact that it violates MAXATR.

Let us now examine low-mid cases such as **abo** 'female' and **abó** 'plate.' The contrast between these two forms is viewed as a difference between a root with an RTR specification and a root with an ATR specification. This is a reasonable view given that the harmonic property of the post-low mid vowel does not derive from the preceding low vowel – if it were so, **abo** and **abó** would surface as **abɔ**. That is, there would be no segmental contrast between these two forms.

Consider first the result of having a root RTR specification in a low-mid sequence:

(14) SY and IY Low-Mid sequence with a lexical RTR: complete harmony

	R /abO/ 'plate'	LO/ RTR	ALIGNR- RT	MAX RTR	ALIGNL- RT	DEP RTR	DEP ATR
a.	A ^ əbo	*!		*			*
b.	A R əbo	*!			*		*
c.	R A abo		*!				*
☞ d.	R ^ abɔ						

As can be seen in (14), rejection of a candidate may result from failure to parse a retraction feature, which also yields a costly violation of grounding – the situation in (a); violation of grounding also results from failure of leftward spreading, a fatal violation, as shown by the failure of (b); misaligning the root retraction feature is not optimal, as demonstrated by the rejection of the third candidate (c). Optimal (d), in contrast, parses RTR and spreads it leftward within the root, producing a fully harmonic representation.

Consider now the result of having an input ATR specification:

(15) SY and IY Low-Mid sequence with a lexical ATR: grounding-based disharmony

A	LO/ RTR	ALIGNR- RT	MAX RTR	MAX ATR	ALIGNL- RT	DEP RTR	DEP ATR
a.	A ^ əbo	*!	*				
b.	A R əbo	*!	*			*	
☞ c.	R A abo				*	*	
d.	R ^ abɔ			*!		*	

The optimal form, (15c), shows that it is optimal to parse an input ATR in a low-mid sequence provided that the ATR value is retained at the right edge of the

root where violation of grounding is not produced. In addition, LO/RTR compels the insertion of a retraction feature on the initial low vowel making cooccurring vowels disharmonic. Of all the candidates generated in (15), the form in (d) is a major contender. Like the winner, this form obeys grounding and appears to be better than the optimal form because it is fully harmonic. However, it is ruled out by violation of MAXATR. This shows that it is important to parse an ATR specification if violation of grounding would not result.

In summary, as in SY, the required retraction on IY low vowels is proposed to follow from the enforcement of LO/RTR, derived in OT by ranking this constraint above DEPRTR so that even if one were to posit an underlying advanced low vowel, it would still surface as retracted. Furthermore, the asymmetry displayed by low vowels with respect to the spreading of retraction is shown to follow from the ranking of alignment and faithfulness.

4. Harmonic differences in Standard and Ife Yoruba: the case of high vowels

Until now, SY and IY have been shown to pattern alike with respect to the harmonic behavior of mid and low vowels. Thus, the same constraints and constraint ranking have been shown to apply in the two dialects. In this section, the properties of high vowels are described and analyzed. Comparing SY and IY, it is shown that high vowels share only one property: highness and advancement. Two important divergences are observed: (1) the possibility of a pre-high retracted mid vowel in SY and the impossibility of the same combination in IY and (2) the opacity of high vowels to the transmission of retraction in SY in sequences such as mid-high-mid and mid-high-low and the transparency of high vowels in the same contexts in IY. These properties are analyzed as following from different rankings of the same set of constraints.

4.1. Invariably advanced high vowels: undominated HI/ATR

Like SY high vowels, IY high vowels are always advanced, never retracted:

(16) High vowels are invariably advanced:

bí 'give birth'

rí 'to see'

isu 'yam'

igi 'tree'

Unattested: ***bi**, ***isu**

As shown for SY (Archangeli and Pulleyblank 1994, Pulleyblank 1996), the impossibility of retraction on high vowels in IY demonstrates the enforcement of HI/ATR: only the grounded combination of highness and advancement is allowed.

Since obedience to HI/ATR is absolute, HI/ATR must outrank MAXRTR and DEPATR so that even if there is an underlying form with an RTR specification, high vowels will always emerge as advanced:

(17) HI/ATR-based violation of faithfulness: HI/ATR >> MAXRTR, DEPATR

	R /bI/ 'gibe birth'	HI/ATR	MAXRTR	DEPATR
☞ a.	A bi		*	*
b.	R bi	!*		

The well-formedness of (17a) is proof that the dominance of HI/ATR can lead to non-fatal violations of faithfulness. On the other hand, the ill-formedness of (17b) shows that faithfulness cannot be satisfied at the expense of grounding.

4.2. Forms with final high vowels: Relative versus absolute alignment

Having shown that HI/ATR is undominated, consider next the behavior of high vowels and co-occurring mid vowels. As shown in (18), while advanced and retracted mid vowels may follow a high vowel in both SY and IY (18a, b), only advanced mid vowels may occur before a high vowel in IY (18c); the attested SY pattern in (18d), where retracted mid vowels precede a high vowel cannot occur in IY. Interestingly, attested IY forms in (18c) are cognates of the possible SY forms in (18d):

(18) Mid-high and High-mid sequences

a. High plus advanced mid: ✓IY, ✓SY		b. High plus retracted mid: ✓IY, ✓SY	
igbe 'noise'		ìgbé 'excrement'	
igbó 'bush'		ilè 'ground, floor'	
eruku 'dust'		itó 'saliva'	
ìrèké 'sugarcane'		ìròlé 'evening'	
c. Advanced mid plus high: ✓IY, *SY		d. Retracted mid plus high: *IY, ✓SY	
èbi 'guilt'		èbi 'guilt'	
èrù 'fear'		èrù 'fear'	
èwù 'clothing'		èwù 'clothing'	
èbùrú 'shortcut'		èbùrú 'shortcut'	

The differences in the SY and IY cooccurrence patterns in (18) results from differences in alignment. As Pulleyblank (1996) points out, alignment of a harmonic feature may be relative or absolute. In Yoruba, for example, the root's right edge is the preferred linking edge (Archangeli and Pulleyblank 1989, 1994).¹² As demonstrated for SY by Pulleyblank (1996), (18d) is possible because the alignment of retraction is to the rightmost non-high vowel. Thus, in a high-mid sequence (18b), a retraction feature associates to the right edge because there is a valid anchor at the right edge for right edge alignment. In a mid-high sequence (18d), on the other hand, the initial mid vowel is the rightmost non-high vowel and so receives the retraction specification. In this latter case, the final high vowel is always "skipped" to avoid a fatal violation of HI/ATR. In OT terms, this latter example demonstrates that HI/ATR and MAXRTR dominate ALIGNR-RT. That is, rightward alignment is violable. To illustrate, consider the choice of the output of *ɛbi* 'guilt'.

- (19) SY relative alignment: HI/ATR >> MAXRTR >> ALIGNR-RT >> DEPATR

	R /EbI/ <i>guilt</i>	HI/ATR	MAXRTR	ALIGNR-RT	DEPATR
a.	A ^ e b i		*!		*
b.	R ^ ɛ b i	*!			
c.	R A ɛ b i			*	*

As shown in (19c), the input retraction feature is not successfully aligned to the right edge in the optimal candidate; this way fatal violations of HI/ATR are avoided.

12. Research in psycholinguistics shows that word-initial material carry more information than word-final material (Nooteboom 1981, Hawkins and Cutler 1988, etc.). From this proposal, follows the prediction that an initial vowel is more likely to trigger phonological events (such as assimilation and harmony) than final vowels. This prediction is partially fulfilled in Yoruba: assimilation is controlled by the initial vowel (Pulleyblank 1998) but harmony is generally controlled by the final vowel (Archangeli and Pulleyblank 1989, Baković 2000). Another evidence showing that a word-final position is stronger than an initial position is consonantal deletion, which preferably deletes the consonant of a non-final syllable. For example, when identical consonants occur in a word, the first one deletes but the second one is retained. Hence, *agogo* 'bell' becomes *aago*, not **agoo*. Ọla (1995) argues that these forms are best explained by the principle that: if the final syllable is the head of the word, a word-head syllable is shielded from deletion whereas a non-head syllable is not. Evidence from Yoruba thus shows, contrary to the claim in psycholinguistics, that the left and right edges in a language could be strong, albeit for different purposes.

The crucial thing here is the parsing of RTR even if parsing results in misalignment. On the other hand, candidate (19b), with perfect alignment, is non-harmonic because it disrespects higher-ranked HI/ATR. Finally, candidate (19a) fails due to a violation of faithfulness: a lexical RTR must be parsed if violations of grounding would not result.

The ranking in (19) also accounts for mid-high-high cases such as **èbùrú** ‘short-cut’. This form shows that high ranking HI/ATR may cause a root retraction specification to migrate further into the root. In other words, there may be more than one violation of right edge alignment in SY. The crucial factor is that it is optimal to parse a retraction specification if there is a viable RTR-bearer in the root.

Having shown that the dominance of ALIGNR-RT by MAXRTR derives SY forms like **èbi** ‘guilt,’ the question is how are IY cases like **èbi** ‘guilt’ and ***èbi** explained? Alignment provides the answer to this question. In IY, right-edge alignment is absolute.¹³ That is, an input harmonic specification must appear at the right edge of the root. If grounding requirements prevent a root harmonic specification from appearing at the right edge, underparsing results. Reversing the ranking established for SY achieves this result. Specifically, if HI/ATR and ALIGNR-RT outrank MAXRTR in IY, forms with mid-high sequences and a retraction value will surface as (o/e...i/u) because this ranking makes it optimal to not parse a retraction feature that cannot be successfully aligned with the right edge. Hence, SY forms such as **èbi** ‘guilt’ are correctly ruled out in IY. The following tableau shows how reversing the ranking of faithfulness and alignment accounts for the observed dialectal variation in mid-high forms:

- (20) IY absolute alignment: HI/ATR, ALIGNR-RT >> MAXRTR >> DEPATR

R /Ebi/ ‘guilt’	HI/ATR	ALIGNR-RT	MAXRTR	DEPATR
a. $\begin{array}{c} \text{A} \\ \wedge \\ \text{e b i} \end{array}$			*	*
b. $\begin{array}{c} \text{R} \\ \wedge \\ \text{ɛ b i} \end{array}$	*!			
c. $\begin{array}{cc} \text{R} & \text{A} \\ & \\ \text{ɛ} & \text{b i} \end{array}$		*!		

As shown in (20a), it is optimal to underparse a retraction feature which cannot be aligned with a root’s right edge. The remaining candidates, in contrast, parse

13. Hence, IY is like Wolof, which is discussed in Pulleyblank (1996). The interested reader is directed to this work for a detailed discussion of Wolof vowel harmony in Optimality Theory.

RTR but fail either because of grounding (20b) or misalignment (20c).

Given that input forms such as posited in (20) never surface with a retracted feature, a reviewer wonders if there is evidence that IY has an RTR in the input. One way of avoiding an underlying representation with an RTR would be to posit an input ATR value. With such an input, the correct surface form (**èbi**), would be obtained. While it is true that cases such as **èbi** ‘guilt’ may be derived by positing an underlying ATR, an account along these lines is undesirable because it misses an important generalization that the facts of harmony are identical in the two dialects even in cases involving high vowels. First, as shown for mid and low vowels in section 3, input forms in SY and IY are alike. Second, forms with initial high vowels pattern alike in the two dialects, again presenting evidence for having identical input forms; and third, in both SY and IY, forms with medial high vowels have the same harmonic specification for final mid vowels (SY **èlùbó** and IY **èlùbó**, discussed in section 4.3. below). Since the facts involving mid, low, initial and medial high vowels present evidence for having identical input forms in the two dialects, it seems unnecessarily ad hoc to posit separate underlying representations for forms with final high vowels. The position taken here – having the same input forms for the two dialects and deriving observed surface variation by varying the ranking of the same constraints – avoids this problem and is therefore more desirable.

4.3. *Opacity versus transparency: forms with medial high vowels*

The next set of facts to be considered is the behavior of medial high vowels when flanked by mid vowels. This is illustrated in (21).

- (21) Possible Mid-High-Mid sequences:
- | | | | | | | | | | | | | | | | | | |
|---|----------------------|----------------------|--------------|---------------|--------------|---------------|--------------|----------|---|-------------|--------|--------------|-------------|--------------|---------|--------------|----------|
| <p>a. Advanced–High–Advanced:
✓IY, ✓SY</p> <table border="0"> <tr> <td>ògùrò</td> <td>‘stick for stirring’</td> </tr> <tr> <td>eúrò</td> <td>‘bitter leaf’</td> </tr> <tr> <td>oríwo</td> <td>‘boil, tumor’</td> </tr> <tr> <td>èbúté</td> <td>‘port’</td> </tr> </table> | ògùrò | ‘stick for stirring’ | eúrò | ‘bitter leaf’ | oríwo | ‘boil, tumor’ | èbúté | ‘port’ | <p>b. Retracted–High–Retracted:
✓IY, *SY</p> <table border="0"> <tr> <td>eúré</td> <td>‘goat’</td> </tr> <tr> <td>èlùbó</td> <td>‘yam flour’</td> </tr> <tr> <td>òtító</td> <td>‘truth’</td> </tr> <tr> <td>òdíde</td> <td>‘parrot’</td> </tr> </table> | eúré | ‘goat’ | èlùbó | ‘yam flour’ | òtító | ‘truth’ | òdíde | ‘parrot’ |
| ògùrò | ‘stick for stirring’ | | | | | | | | | | | | | | | | |
| eúrò | ‘bitter leaf’ | | | | | | | | | | | | | | | | |
| oríwo | ‘boil, tumor’ | | | | | | | | | | | | | | | | |
| èbúté | ‘port’ | | | | | | | | | | | | | | | | |
| eúré | ‘goat’ | | | | | | | | | | | | | | | | |
| èlùbó | ‘yam flour’ | | | | | | | | | | | | | | | | |
| òtító | ‘truth’ | | | | | | | | | | | | | | | | |
| òdíde | ‘parrot’ | | | | | | | | | | | | | | | | |
| <p>c. Advanced–High–Retracted:
*IY, ✓SY</p> <table border="0"> <tr> <td>eúré</td> <td>‘goat’</td> </tr> <tr> <td>èlùbó</td> <td>‘yam flour’</td> </tr> <tr> <td>òtító</td> <td>‘truth’</td> </tr> <tr> <td>òdíde</td> <td>‘parrot’</td> </tr> </table> | eúré | ‘goat’ | èlùbó | ‘yam flour’ | òtító | ‘truth’ | òdíde | ‘parrot’ | <p>d. Retracted–High–Advanced:
*IY, *SY¹⁴</p> | | | | | | | | |
| eúré | ‘goat’ | | | | | | | | | | | | | | | | |
| èlùbó | ‘yam flour’ | | | | | | | | | | | | | | | | |
| òtító | ‘truth’ | | | | | | | | | | | | | | | | |
| òdíde | ‘parrot’ | | | | | | | | | | | | | | | | |

14. The impossibility of this sequence is evidence that association of a root retracted specification is to the right edge, not the left edge (Archangeli and Pulleyblank 1989). If association to the left were to take precedence over association to the right, this unattested sequence ought to be possible.

The examples in (21a) and (21b) show that two mid vowels may flank a high vowel in IY if both mid vowels are advanced or retracted. However, non-harmonic mid vowels cannot occur on either side of a high vowel as evidenced by the impossibility of (21c) and (21d). Note, however, that (21c) is possible in SY. Comparing mid-high-mid-sequences in IY and SY, we see the following commonalities: in the two dialects, (21a) is possible and (21d) is ungrammatical. (21b) and (21c), which are in fact cognates in SY and IY, constitute the dividing line. As exemplified by these two sets of data, only the fully harmonic set is permissible in IY while SY allows only the disharmonic set in (21c).

Before an analysis of (21) is given, consider (22), involving mid-high-low forms:

(22)	a.	IY	b.	SY	Gloss
		ɔ̀sùpá		òfùpá	'moon'
		òruka		òrùka	'ring'
		òrisà		òrìfà	'primordial deity'
		òkuta		òkuta	'stone'

The facts in (22) are obviously parallel to those in (21b) and (21c). As shown in (22a), despite the fact that medial high vowels are advanced in IY, flanking low and mid vowels agree harmonically: both are consistently retracted. In SY, however, harmony is not possible, as demonstrated by the advancement of pre-high mid vowels.

What we are looking at – the differences between IY and SY – are differences between transparency and opacity. It is often assumed that transparency provides evidence that long-distance assimilation is permitted, contrary to the requirements of locality (e.g., Steriade 1987b). Opacity, on the other hand, demonstrates that spreading is strictly local. Although this analysis ‘works’, it is inconsistent. Why would locality be compromised in some languages and not in others? Pulleyblank’s account for Standard Yoruba and Wolof avoids this problem by proposing that the interaction of alignment and DEP derives opacity or transparency. In this view, long-distance harmony or transparency results from feature insertion, not spreading and opacity results from the impossibility of insertion, not the blockage of spreading. Pulleyblank accounts for opacity in SY by ranking HI/ATR and DEPRTR above ALIGNL-RT. That is, alignment cannot force the insertion of a retraction feature on an initial mid vowel to enforce harmonic agreement with a retracted final vowel. The result is disharmony between two mid vowels which are separated by a high vowel. The ranking in (23) derives the opacity effect in SY (an inserted RTR feature appears in boldface in the tableaux):

- (23) HI/ATR >> MAXRTR >> ALIGNR-RT >> MAXATR >> DEPRTR >> ALIGNL-RT >> DEPRTR
- (24) SY medial high vowel opacity:

R	HI/ATR	MAX RTR	ALIGNR -RTR	MAX ATR	DEP RTR	ALIGNL -RT	DEP ATR
a. $\begin{array}{c} \text{A} \\ \swarrow \downarrow \searrow \\ \text{e l u b o} \end{array}$		*!					*
b. $\begin{array}{c} \text{R} \\ \swarrow \downarrow \searrow \\ \text{e l u b o} \end{array}$!*						
c. $\begin{array}{c} \text{R A} \\ \swarrow \downarrow \searrow \\ \text{e l u b o} \end{array}$			*!*				*
d. $\begin{array}{c} \text{R A R} \\ \swarrow \downarrow \searrow \\ \text{e l u b o} \end{array}$					*!	*	*
e. $\begin{array}{c} \text{A R} \\ \swarrow \downarrow \searrow \\ \text{e l u b o} \end{array}$						**	

As can be seen in (24), the first candidate, (a), is ruled out for failing to parse the lexical retraction feature. In the second candidate, (b), RTR is parsed but produces a fatal HI/ATR violation, thus making this candidate ill-formed. In the third candidate, fatal violations of higher-ranked HI/ATR and MAXRTR are avoided, but RTR is aligned with the left edge instead of the preferred right edge, a fatal violation since there is a viable anchor for alignment at the right edge. The fourth candidate obeys high-ranking grounding, parsing, and alignment but fails due to a violation of faithfulness, showing that leftward alignment cannot be achieved at the expense of DEPRTR, the faithfulness constraint prohibiting insertion. In the last candidate, leftward alignment of retraction is violated but this is not fatal since ALIGNL-RT is subordinate to the other constraints in ranking. In fact, opacity results from the failure of leftward alignment.





As mentioned earlier, like opacity, transparency also derives from the interaction alignment and DEP. For IY cases involving advanced mid-high-mid sequences, e.g., **eúro** ‘bitter leaf’, the analysis is straightforward. ATR is parsed and aligned throughout the root because grounding is not an issue. Forms involving a root RTR specification, e.g., **èlùbó** ‘yam flour’ are crucial for illustrating how long-distance harmony can be explained by constraint interaction. To derive **èlùbó**, HI/ATR and ALIGNL-RT must be crucially ranked above DEPRTR. This ranking makes it possible to insert a retraction specification on an initial vowel when a final mid vowel is also retracted. This way, long distance retraction harmony is achieved and the medial high vowel is advanced. Put together with the ranking established

for high vowels previously, the ranking needed to account for (21) and (22) is as follows:

- (25) HI/ATR, ALIGNR-RT >> MAXRTR >> MAXATR >> ALIGNL-RT >> DEPRTR >> DEPATR

With this ranking in hand, consider the case of **eúro** ‘bitter leaf,’ shown below:

- (26) IY medial high vowel transparency: morphemes with ATR specification

A /Eúro/ ‘bitter leaf’	HI/ ATR	ALIGNR -RT	MAX RTR	MAX ATR	ALIGNL -RT	DEP RTR	DEP ATR
a. R 	!*					*!	
b. A R 					*!*	*	
c. RA R 		*!			*	**	
d. A 							

The occurring form (26d) is optimal because it does not incur violations of constraints. On the other hand, violation of MAX and ALIGN rule out possible competitors.

In cases where there is a root RTR specification, e.g., **èlùbó** ‘yam flour’, retraction must be linked to the second mid vowel because of high-ranking ALIGNR-RT. In addition, The enforcement of ALIGNL-RT induces violation of faithfulness – DEPRTR – which enables a pre-high mid vowel to receive a retraction feature like its post-high counterpart. The only violation of alignment tolerated is that compelled by high-ranking HI/ATR, which prohibits a high vowel from harmonizing in a retraction context. The following ranking and tableau illustrate the evaluation of **èlùbó** ‘yam flour.’





(27) IY medial high vowel transparency: morphemes with RTR specification

R /EIUbO/ flour'	HI/ ATR	ALIGNR -RT	MAX RTR	MAX ATR	ALIGNL -RT	DEP RTR	DEP ATR
a. A └─┬─┘ elubo			*!			*	
b. R └─┬─┘ elubo	*!						
c. R A └─┬─┘ elubo		*!*					*
d. A R └─┬─┘ elubo					**!		*
e. R A R └─┬─┘ elubo					*	*	*

In (27), given the high ranking of MAXRTR, the lexical RTR specification cannot be left unparsed, thereby ruling out the candidate in (a). A retracted high vowel is ill-formed in IY, eliminating a candidate such as (b). A lexical retraction feature must be aligned with the right edge of the root, hence a candidate like (c) is impossible. In the same vein, a candidate is eliminated if retraction does not appear at the left edge on a viable target of harmony, as in (d). An optimal candidate must obey the high ranking constraints, as demonstrated by the well-formedness of (e). Observe with respect to (e) that an ALIGNL-RT violation is non-fatal as long as it is HI/ATR-driven; fatal violations are penalized as illustrated by the ill-formedness of (d).

Given the analysis of medial high vowel transparency in (27), the results for the mid-high-low forms in (22a: *ḡsùpá* 'moon') are similar, as illustrated in (28):

(28) IY medial high vowel transparency: morphemes with final low vowels

R /OsUpA/ 'moon'	HI/ ATR	LO/ RTR	ALIGNR- RT	MAX RTR	MAX ATR	ALIGNL- RT	DEP RTR	DEP ATR
a. R  ɔsɹpa	*!							
b. A  osɹpə		*!		*				*
c. A R  osɹpa						**!		*
d. R A R  ɔsɹpa						*	*	*

Any violation of grounding is fatal, as demonstrated by suboptimal (28a) and (28b). Comparing the ill-formedness of (28c) with the well-formedness of (28d), it is clear that only minimal violations of ALIGNL-RT are allowed; such violations are incurred because of the pressure to satisfy grounding (HI/ATR).

4.3.1. *Transparency analysis and the OCP.* So far, the following regularities concerning the distribution of IY medial high vowels have been identified:

- (29) a. in mid-high-mid sequences, a medial high vowel must be flanked by mid vowels of the same harmonic specification, advanced (21a) or retracted (21b).
- b. in mid-high-low sequences, a mid vowel must bear the same harmonic specification as the low vowel. That is to say, the initial vowel must be retracted like the final low vowel (22a).

Retracted forms such as **èlùbò** 'yam flour' and **ɔ̀sùpá** 'moon' are interesting because they have more than one retraction value, a root retraction specification and a retraction value, which is inserted to satisfy leftward alignment. Other cases involving multiple RTR specifications appear below—low-high-low sequences:

- (30) Multiple surface retraction specifications
 - àkísà** 'rag'
 - aùsá** 'type of nut'
 - àríwá** 'north'
 - àsíá** 'flag'

In (30), LO/RTR causes cooccurring low vowels separated by high vowels to be retracted.

Forms with multiple RTR raise the question of whether violations of the Obligatory Contour Principle (OCP) are incurred:

- (31) Obligatory Contour Principle (Leben 1973, McCarthy 1986, Yip 1988):
A sequence of identical elements on the same tier is prohibited

Following Odden (1994), I assume that locality entails strict adjacency (32); that is, two elements are adjacent if there is no intervening material (33). If another element separates two identical elements, then, they are no longer adjacent and do not constitute OCP violations (34).

- (32) Locality Condition: In a relation involving A, B and the nodes α, β which they dominate, nothing may separate α and β unless it is on a distinct plane from that of α or β .

- (33) Adjacency requirement satisfied



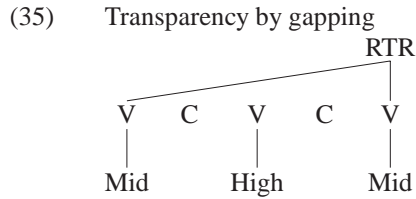
- (34) Adjacency requirement not satisfied



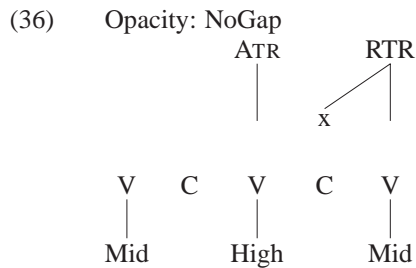
On this view, forms like *ɛ̀lùbó* ‘yam flour’ and *àríwá* ‘north’ do not constitute OCP violations because of the presence of ATR on the medial high vowel.¹⁵ The fact that this ATR is functional in the phonology of SY and IY is evidenced by the undominated status of the grounding constraint, HI/ATR in the two grammars.

4.3.2. *Transparency and gapped representation.* There is an obvious alternative to the analysis presented here, namely, deriving transparency from a gapped representation. Consider the structure in (35):

15. Pulleyblank (1996) derives this effect by restricting the OCP to root specifications. OCPRT: in the root domain, a sequence of identical elements on the same tier is prohibited. In other words, since the retraction in forms like *ɛ̀lùbó* and *àríwá* never involve more than one root specification, OCPRT is not violated. A reviewer notes, however, that this argument does not carry through because the OCP is an output constraint and cannot determine which one of two identical output features within the root was in the input. Hence, a domain-based OCP cannot be proof that violations of OCP are not incurred.



Under a transparency-by-gapping analysis, e.g., Steriade (1987), the root retraction specification is able to spread from one mid vowel to another because the intervening high vowel is unspecified for an advanced harmonic feature when the rule applies. What is particularly attractive about this solution is that it enables us to explain why high vowels are not triggers, blockers, or undergoers of harmony. Moreover, opacity, the mirror image of transparency, is easily derived by specifying the non-harmonizing intervening high vowel as harmonically advanced (36). Since this medial high vowel bears an incompatible harmonic feature, the spreading of retraction cannot bypass it, leading to opacity.



There are problems with the representation in (35), however. First, positing a gapped representation of the type in (35) incorrectly implies that the harmonic value of the medial high vowel is never referenced phonologically. In Yoruba, while it is true that RTR is the more frequently referred to, ATR is also referenced by the HI/ATR constraint. Because the tongue root value of high vowels is referenced in the phonology, the gapped representation in (35) is problematic from a phonological viewpoint.

The representation in (35) is also problematic from a phonetic standpoint. As Pulleyblank (1996) points out, gapped representations are not interpretable phonetically. Thus, they are converted into a partially or fully specified representation prior to phonetic interpretation. He concludes that the necessity of such a conversion makes this analysis less desirable than a constraint ranking analysis which does not require such an operation.

The constraint interaction analysis developed here solves the problems identified above. High vowels are singled out in a retraction context as non-participants in harmony because of HI/ATR. Ranking HI/ATR highly in a grammar has the effect of making all high vowels advanced, irrespective of whether they are opaque

or transparent. Since the limits of parallel output evaluation in OT obviates the need to build non-occurring output structures such as the gapped configuration in (35), the distinction between opacity and transparency cannot be representational. It must follow from constraint interaction. As shown in section 4.3, high vowel opacity versus transparency derives from the variable ranking of the same constraints: HI/ATR, DEPRTR, and ALIGNL-RT.

5. Comparison with an alternative account¹⁶

Baković (2000) proposes an analysis of SY that is similar in one respect to the one presented here: it adopts grounding and faithfulness¹⁷ constraints. There are two crucial differences. First, harmony is driven by AGREE (ATR), not alignment. Second, harmony is controlled by the final vowel of the root. Crucially, the final vowel is specified for a given harmonic value in the input and non-final vowels derive their harmonic specification from it (i.e., the final vowel).¹⁸

Let us evaluate the claims of this theory for the two dialects under consideration. Like the alignment account offered in this paper, the stem controlled theory explains cases involving mid and low vowels straightforwardly. In this account, AGREE (ATR) causes an initial mid vowel to harmonize with a final mid vowel, which may have an ATR or RTR (**oko** vs. **ɔkɔ**). AGREE (ATR) also causes an initial mid vowel to be retracted when the final vowel is low (**ɔba** ***oba**). In low-mid sequences, however, AGREE (ATR) is obeyed if the final mid vowel is retracted (**abó**) but disobeyed if advanced (**abo**) because LO/RTR prohibits advanced low vowels. To account for forms with final high vowels, which are preceded by retracted mid vowels (**ɛbi**), an abstract retracted high vowel is posited underlyingly (**Ebr**). This abstract vowel transmits retraction to the initial high vowel at an opaque level of analysis (**ɛbr**) but does not surface (***ɛbr**, ✓**Ebr**) because of high ranking HI/ATR.

There are two major problems with this proposal. The first problem is that the SY account cannot be extended to IY because retracted mid vowels never occur before final high vowels in this dialect. Hence, different underlying roots must be posited for SY **ɛbi** ‘guilt’ and IY **èbi** ‘guilt.’ The more serious problem is that incorrect predictions are made for mid-high-high sequences in vowel height

16. There are two other alternatives. The first is Omişore’s (1989) comparative study, which claims that IY vowel harmony is identical to the harmonic system of SY. As shown, this characterization is incorrect: high vowels behave differently in these two dialects. The second alternative is the Optimal Domains theory account, which, as argued by Pulleyblank (1996), is not a better alternative to the analysis presented in this paper. Since Pulleyblank does an excellent job of critiquing this approach, I will not discuss the Optimal Domains theoretic view in this paper.

17. There is a difference, however, in the parsing constraints used. Whereas MAX is used in this paper, IDENTF is adopted by Baković.

18. This proposal is similar to Ọla’s (1992) Government phonology account of Yoruba vowel harmony.

such as SY **èbùrú** ‘short-cut’ and IY **èbùrú** ‘short-cut.’ Recall that medial high vowels are opaque in SY but transparent in IY. If the final vowel controls harmony, then a retraction specification is predicted not to appear in SY **èbùrú** because the medial high vowel ought to block transmission of retraction producing ***èbùru**, but it does not. Likewise, the predicted form in IY is ***èbùrú** since medial high vowels are transparent – an incorrect prediction. The alignment-based proposal does not run into these difficulties. As shown in section 4, deriving harmony by alignment accounts for cases involving high vowels without positing an abstract vowel, which makes incorrect predictions.

6. Conclusion

Let us now briefly summarize the facts about IY and SY vowel harmony that the analysis touches on:

- (37)
- a. Mid vowels harmonize completely in the two dialects: retracted forms cooccur and advanced forms cooccur.
 - b. Low vowels are invariably retracted.
 - c. High vowels are invariably advanced.
 - d. Pre-low mid vowels are always retracted but post low mid vowels may be advanced or retracted.
 - e. High vowels occur with the full range of vowels in SY but in IY mid vowels preceding a high vowel must be advanced.
 - f. Medial high vowels neither harmonize nor permit the leftward propagation of retraction in SY; in contrast, in IY, intervening high vowels are transparent to the transmission of retraction: they are neither triggers, blockers nor undergoers of harmony.

I have shown that the similarities and differences in (37) are best accounted for through the interaction of grounding, faithfulness, and alignment. By varying the rankings of these constraints, the unique properties of cooccurring vowels are accounted for. For example, the difference between opacity (SY) or transparency (IY) follows from the variable ranking of grounding, faithfulness, and alignment (Pulleyblank 1996). Where grounding and faithfulness outrank alignment, the result is opacity; where grounding and alignment outrank faithfulness, the result is transparency. The analogue of a constraint-based treatment of opacity and transparency in rule-based frameworks are the quintessential representations in (35) and (36). One of the major problems with a representation like (35) is that it is only an underlying configuration – it never appears in the phonetics. In contrast, the OT account presented here is very successful in accounting for transparency without setting up ad hoc parameters or constraints on locality.

This approach also contrasts with Baković’s recent analysis of SY which posits two underlying forms for retracted mid-high sequences (**èbi**): one with an abstract

retracted high vowel (**ɛ̃bɪ**) and another with an advanced high vowel (**ɛ̃bi**). However, as I have shown, there are two problems with this analysis. First, it cannot be extended to IY; second, it makes incorrect predictions. In contrast, the SY alignment-based account can be extended to IY. Further, it does not posit an abstract segment to account for cases like **ɛ̃bi** ‘guilt’ and does not make incorrect predictions.

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