Palatalization and Centralization in Samothraki Greek

1. Introduction

Like most (or even all) varieties of Greek, the Samothraki dialect shows palatalization of velar consonants before front vowels. What makes this dialect of particular interest to phonological theory, however, is that the palatalization in this dialect interacts with the phonological processes of r-deletion and vowel centralization in a rather complicated way. On the one hand these other processes make palatalization opaque in certain contexts, which gives a classical argument for a derivational approach. On the other hand, palatalization and centralization behave as a conspiracy: two independent processes serving the same goal, viz. avoiding surface sequences of velars and front vowels. Conspiracies are a strong argument in favour of surface-based theories such as Optimality Theory.

We are not aware of any phonological phenomena which show the same combination of (partial) opacity and of conspiracy, and in this paper we discuss the theoretical consequences of our finding. In particular, we argue that at first sight a straightforward solution seems to be provided by any of the numerous proposals which aim to add a derivational mechanism to Optimality Theory. We might think that under such a scenario we could maintain both the conspiracy effect and the opacity, but we show that such approaches necessarily have to make some
arbitrary assumptions, and do not really explain the connection between palatalization and r-deletion. We then go on to propose an analysis based on a more in-depth study of the representations involved in the three processes at hand, and we show how some fairly standard assumptions on the nature of palatalization, centralization and compensatory lengthening can help us understand them.

2. Three processes of Samothraki phonology

Samothraki Palatalization is unremarkable for those who are familiar with the phonology of other varieties of Greek: voiced and voiceless velar fricatives and plosives palatalize before the front vowels /i/ (and before /e/, but we concentrate on the context before the high vowel for reasons of space):

\[1\] /fegi/ \[fe\acute{g}\] φέγγει 'he beams/shines' (K66)
/toki/ \[to\acute{k}\] τόκοι '(bank) interests' (K66)
/kima/ \[kima\] κύμα 'wave' (K62)
/xino/ \[\chi\acute{n}\] χύνω 'pour' (K63)
/\gamma/na/ \[\gamma\acute{e}n\] γέννα 'birth' (K63)

Our data in this paper are from Katsanis (1996), which we abbreviated in the examples above as K. We are not sure of the precise phonetic identity of the palatalized consonants. Following Katsanis, we will note it with an apostrophe. Notice that the first two examples show that palatalization interacts opaquely with final high-vowel deletion; this is a fact which we will ignore here, as it is irrelevant to our present purposes.

Samothraki Greek also has phonological processes which are not attested as widely in Greek dialectology. Notable among these is a process of /r/ deletion in onsets, resulting in a typologically rare case of 'compensatory lengthening' of the following vowel (see Topintzi 2006 for an extensive discussion). The process applies regardless of whether the /r/ stands in the onset alone, or is part of a more complex onset structure.

\[2\] /roga/ \[o:ga\] ρώγα 'nipple'
/rema/ \[e:ma\] ρέμα 'stream'
/xroma/ \[xo:ma\] χρώμα 'colour'
/mavros/ \[mavu:s\] μαύρος 'black'
/krotos/ \[ko:tus\] κρότος 'bang'

Palatalization and /r/ deletion interact in sequences consisting of a complex onset of a velar plus an /r/ followed by a high vowel underlingly. /r/ deletion in this case potentially leads to a velar-plus-front vowel sequence, which is however not resolved by palatalization, as we would expect in a monostratal, purely surface-based account.

\[3\] /krima/ \[ki:ma\] κρίμα 'shame' – [kima] κύμα 'wave'
/xrima/ \[xi:ma\] χρήμα 'money' – [\chi\acute{ima}\] χύμα 'bluntly'

[386]
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/krino/ [ki:nu] κρίνω 'judge' – [ki:nu] (ε)κείνο 'that'
/kremnos/ [ka:mnus] κρεμνός 'cliff'

In the remainder on this paper we will concentrate on the first two examples in [3], which form a nice minimal pair. The interaction looks very much like opacity, but there is a twist: it is not the case that nothing happens to the /ki/ sequence; rather, the front vowel centralizes to a vowel which is compared by Katsanis to the back unrounded vowel of Turkish and the central (high) vowel of Romanian (K, 35–6). At first sight, we might assume that this centralization is due to the lengthening: maybe long vowels get centralized for some reason. However, this is demonstrably false since high vowels lengthen after /r/ loss in other contexts, without centralization being the result (K, 54–5):

[4]

/prima/ [pi:ma] πρίμα 'fine'
/prepi/ [pe:p(i)] πρεπει 'it must'
/tripa/ [ti:pa] τρύπα 'hole'
/trexo/ [te:xu] τρέχω 'I run'
/fridi/ [fi:ð] φρύδι 'eyebrow'

Opacity is a classical problem for Optimality Theory, and as we have already stated, the Samothraki facts look very much like opacity. However, it does not fit exactly with the standard definition of opacity (adapted from Kiparsky 1973):

[5] A rule $A \rightarrow B /C __ D$ is opaque iff:
a. We find CAD on the surface, or
b. We find a B on the surface which has been derived from A, but is not in the context of $C __ D$

In this terminology, palatalization in Samothraki Greek is a case where we find underlying A in the surface context of $C __ D$, so this almost fits the definition in [5a]. However, the process is not completely opaque, because we do not find plain velars before front vowels. There is another process preventing this from happening, which is centralization. A derivational analysis of these facts would run along the following lines: the three processes would be crucially ordered with palatalization preceding $r$-deletion preceding centralization.

[6] underlying form krima kima
palatalization – kima
r deletion kima –
centralization kima –
output kima kima

Analyses of this type have the clear advantage of being able to deal with the opaque-like properties of the interaction. On the other hand, these analyses suffer from a classical problem for derivational analyses: since palatalization and centralization seem to aim at the same goal – avoidance of velar + front vowel sequences, these form a conspiracy. Hence we may say that Samothraki Greek
displays an opaque conspiracy. The conspiracy part is a problem for the derivational analysis in [6]: there is no way of expressing the fact that palatalization and centralization are in the grammar for the same reason, or, in terms of OT, in order to satisfy the same constraint, which we will call \( *ki \).

3. Derivational solutions in OT

Because of the stubbornness of the opacity problem, many researchers within the OT paradigm have turned their attention in recent years to implementing derivationalism within that theory. At first sight, this looks like a very promising move if we want to solve the problem at hand: the opacity could be due to the derivationalism, and the conspirational nature to the fact that in all cases the same constraint \( *ki \) is involved.

We will here consider three such approaches, each one being a little bit more derivational: Comparative Markedness, Stratal OT and Candidate Chains theory. We believe that the problems we note for each of these is exemplary for any attempt of trying to solve the Samothraki problem in a (quasi-)derivational way.

3.1 Comparative Markedness

The first analysis we want to discuss is Comparative Markedness (CM, McCarthy 2003). This approach is only partially derivational. Like standard OT it only recognizes two derivational levels, the input and the output; however, it assigns more power to the input representations.

In CM, all traditional markedness constraints are split up into two new constraints which together take the same force as the original one: a ‘new’ and an ‘old’ markedness constraint. An ‘old’ markednesss constraint is violated if it was violated in the same locus in the input and in the output; a ‘new’ markedness constraint is violated if the offending structure is present only in the output. McCarthy (2003) shows how a large variety of phonological effects can be derived from this split system.

It is tempting to see the effect at hand in the same light: we split up \( *ki \) into \( *ki_O \) and \( *ki_N \). The former is violated by /kima/ and leads to palatalization, whereas the latter is violated by /krima/ and leads to centralization. We see two problems with this approach. In the first place, it does not really solve the problem of the conspiracy, since now we have two different markedness constraints responsible for the two effects, even if the names of the constraints are very similar. Secondly, the approach actually would deal with a ranking paradox. Given that \( *ki_O \) leads to palatalization, we know that its ranking position with respect to the two faithfulness constraints NoPalatalization and NoCentralization should be: \( *ki_O, NoCentral \gg NoPalatal \). But given that \( *ki_N \) leads to centralization we know that \( *ki_N, NoPalatal \gg NoCentral \).
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The problem is that it’s not so much the markedness constraint which differs in this case, but the solution which is given to the paradox in each case. There is no way in which the different ordering of the constraints could be dealt with in this framework.

3.2 Stratal Optimality Theory

From the lack of success of CM, we could conclude that we need more derivationalism: we need some way to express that some operations (palatalization and centralization) are sometimes allowed whereas at other times they are not. This is something we could effectuate by introducing a formalism which allows for separate modules of phonology which apply serially. We will thus be able to express that at one level *ki has one effect, and at some later level it has a different effect.

A Stratal OT (see Bermúdez-Otero forthc. for an overview) analysis of the Samothraki facts may thus run along the following lines. We need the following set of constraints (since we are at present mostly interested in the interaction between constraints, we will not go into the details of the individual constraint formulations):

a. *ki: An onset velar obstruent and a following vowel should agree in palatality (adapted from Rubach 2007)

b. NoCentral: Unrounded vowels should be front

c. NoPalatal: Velars should not have a palatal secondary articulation

d. *r/Onset: [r] should not occur in the onset (cf. Topintzi 2006)

e. Max-x: Preserve underlying timing units

f. Max-r: Preserve underlying /r/

These constraints are ordered in subtly different ways in two relevant strata. On the stratum we will call Level I, the r should be preserved (so we know that Max-r ≫ *r/Onset), and at the same time palatalization is the preferred option (NoCentral ≫ NoPalatal). At Level II, these rankings should be the other way around.1

<table>
<thead>
<tr>
<th>(i)</th>
<th>/kima/</th>
<th>Max-r</th>
<th>*r/O</th>
<th>*ki</th>
<th>NoCentral</th>
<th>NoPal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>kima</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>kima</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>kima</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
</tbody>
</table>

1 N.B.: The wavy line in the tableaux is meant to draw attention at the two aspects of re-ranking taking place between the two different strata; Max-x which is not included here is responsible for the lengthening at Level II.
This stratal analysis can capture the opacity by ordering of levels, and to some extent the conspiracy effect by using the same constraint at different levels. However, we have seen that this requires two separate but simultaneous rerankings of constraints, which is still quite arbitrary. Also the fact that *ki plays an important role at different levels is formally a coincidence so that in this sense the conspiracy conundrum is not resolved. And finally, there is no evidence that these differences in constraint ranking are in any way connected to morphological differences, as Stratal OT would predict.

3.3 Candidate Chain Theory

Given the failure of the restrictedly derivational instrument of stratalism, we might turn our attention to a very strong derivational device within OT: Candidate Chain Theory (OT-CC, McCarthy 2007). This theory makes the claim that there are no arbitrary rerankings of constraints; there is only one grammar for every language. This potentially solves one major problem we had with the Stratal analysis. Another problem is also solved: we do not need to stipulate a connection between the phonological derivation and morphological structure in the absence of any evidence to that effect.

Here is a rough sketch of how an OT-CC analysis would work. We assume that the Generator function can only make one change at a time to a representation (insert or delete one segment, add one association line etc.) All these candidates with one change are then evaluated as in standard OT. The winning candidate is again fed into the Generator function, which again applies at most one
PALATALIZATION AND CENTRALIZATION IN SAMOTHRAKI GREEK change. The procedure stops when the input of a loop equals its output, which is guaranteed to happen under standard assumptions about what is a reasonable constraint.

So far, this is an adaptation of the standard theory which actually restricts it in interesting ways (e.g., there is no longer an infinite set of candidates). We will however need a much more powerful device of the OT-CC framework as well, one which allows us to mimic extrinsic rule ordering. This is the concept of the ‘candidate chain’. It is assumed that the first input, the last output and all the intermediate winning forms are stored in a tuple (the candidate chain). Because there is only one change at a time, the difference between two adjacent forms in a chain can be described in terms of one faithfulness violation. This allows us to formulate constraints which function as extrinsic rule ordering. These constraints take the following general shape:

[10] Prec(F1, F2): A violation of faithfulness constraint F2 may not be followed by a violation of faithfulness constraint F1 in the candidate chain.

The relevant constraint in this case would be:

[11] Prec(MAX-r, NoPalatal): A violation of MAX-r may not be followed by a violation of NoPalatal in the candidate chain (r-deletion may not be followed by palatalization)²

Adding this constraint to our established set indeed permits a rather straightforward analysis of the relevant contrast, as the following tableaux for the transparent and the opaque cases may show (the candidates now are displayed as chains; the markedness constraints evaluate the last candidate in the chain):

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{case} & \text{input} & \text{output} & \text{faithfulness} & \text{markedness} & \text{onset} \\
\hline
\text{(i)} & /kima/ & *r/O & \text{MAX} & \text{prec} & \text{NoCen} & \text{NoPal} \\
\hline
+ & \text{a. kima} & \text{kima} & * & & & * \\
& \text{b. kima} & \text{kima} & *! & & & * \\
& \text{c. kima} & \text{kima} & & *! & & *! \\
\hline
\text{(ii)} & /krima/ & *r/O & \text{MAX} & \text{prec} & \text{NoCen} & \text{NoPal} \\
\hline
& \text{a. krima} & \text{kima} & \text{kima} & * & & * \\
& \text{b. krima} & \text{kima} & & *! & & * \\
& \text{+ c. krima} & \text{kima} & \text{kima} & & * & * \\
\hline
\end{array}
\]

Notice that in [12] candidates with e.g. centralization or palatalization before r-

2 While NoPal – as stated here – is a markedness constraint, it can easily be stated as a faithfulness constraint, e.g. ‘preserve underlying backness of velars’. For consistency with the previous analyses, we maintain the markedness version.
deletion are not generated because those feature changes are not optimal in that environment.

The OT-CC analysis can capture both the opacity and the conspiracy effects in one single constraint ranking without stipulating some arbitrary relation to the morphology. However, it does this at a great theoretical cost, viz. by using a Prec (NoPal, Max-r) constraint linking two phenomena which are not conceptually related.

4. The analysis

4.1 Overview

The previous sections have illustrated that the data from Samothraki cause problems for derivational views of this issue. We propose that the problems which these analyses face disappear as soon as we adopt a representational approach that relates the blocking of palatalization with the environment that centralization may emerge, i.e. after /r/-deletion.

Briefly, we propose that undesirable /ki/ sequences are generally resolved through palatalization, which is treated as spreading. Palatalization however is impossible, when velar consonants are underlyingly followed by r which is bound to delete (because of *Onset/r). This is because r-deletion leaves behind a segmental position and spreading is not allowed across this position. *ki therefore needs to be satisfied in a different way, viz. by deletion of the palatal feature, that is, centralization.

The ensuing sections develop the fully-fledged analysis. First, the representations for palatalization and centralization are presented. Subsequently, the lengthening effect of r-deletion is discussed. It is shown that spreading of palatalization from a long vowel is impossible, because of a binarity constraint on feature association that permits ķi but bans ķii. Binarity however is not violated in centralization since no feature spreads there; instead, the palatal feature deletes.

4.2 Analysis in detail

For our analysis, we assume monovalent features and feature geometry (Clements & Hume 1995, McCarthy 1988, Sagey 1986, among others). In this view, palatalization is spreading of the V-Pl-[cor] node of the vowel to the C-Pl node of the consonant [13]. The net effect is the addition of a secondary coronal articulation to the consonant which is rendered as palatalization. As indicated before, palatalization violates NoPal.
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[13] Palatalization as spreading

\[
\begin{array}{ccc}
& k & i \\
C-\text{pl} & C-\text{pl} & \downarrow \\
[dors] & V-\text{pl} & \downarrow \\
[\text{cor}] &
\end{array}
\]

Centralization on the other hand is treated as feature-loss, i.e. the de-linking of the vocalic V-Pl as shown in [14]. This is another response to the high-ranking \( ^*ki \), which nonetheless violates NoCentral.

[14] Centralization as feature-loss

\[
\begin{array}{ccc}
& k & i \\
C-\text{pl} & C-\text{pl} & \downarrow \\
[dors] & V-\text{pl} & \downarrow \\
[\text{cor}] &
\end{array}
\]

\( ^*ki \) is normally satisfied by palatalization; after \( r \)-deletion however, centralization is preferred. We thus need to explain why, in a certain environment, the alternative strategy of centralization is chosen. To be able to deal with this challenge, we need to consider what happens after \( r \)-deletion. As mentioned before (ex \([4]\)), \( r \)-deletion from an onset position in a cluster leads to lengthening of the following vowel, e.g. /tripa/ → [ti:pa], effectively an instance of compensatory lengthening (CL). Topintzi (2006) discusses the need to preserve underlying positions either in terms of quality (segmentally) or quantity (moras). The latter is what CL is about, in Samothraki Greek and elsewhere. For our purposes here, it suffices to mention that \( r \)-deletion leaves a timing slot in its position, which segmentally is filled in by the following vowel leading to lengthening, as in [15].

[15] \( r \)-deletion and lengthening

\[
\begin{array}{ccc}
\times & \times \\
\downarrow & \downarrow \\
r & i
\end{array}
\]

The difference in length between near-minimal pairs like [kima]-[kima] proves crucial. We propose a binarity constraint on feature association that allows palatality to spread from a short vowel, but not from a long vowel. We dub this the BinAss(F) constraint. Further justification of it will be presented in § 5.

[16] BinAss(F): A feature F can be associated to maximally two positions.

Schematically, BinAss(F) admits structures where a feature links to one [17a] or
two [17b] positions, but any other type of multiple association is excluded [17c]. High-ranking BinAss(F) in Samothraki implies that palatalized consonants followed by short vowels are allowed, e.g. \( \bar{ki} \), due to double-linking of V-Pl [cor] (cf. [13]), but long vowels in the same context are banned, e.g. \( \bar{kii} \), as they require triple linking of that feature. Note of course that sequences like \( \bar{pii} \) conform to BinAss(F), since no feature sharing with the consonant is involved.

[17] BinAss(F) and various structures

\[
\begin{array}{cccc}
\times & \times & \times & \times \\
p & i & k & i \\
\end{array}
\]

\text{Allowed} \quad \text{\textbf{Banned}}

All we need to do now is to incorporate BinAss(F) into our ranking at a dominant position. Let us take first the simple case of words with simplex onset velars followed by front vowels. Candidate [b] loses early on, because of a \(*\bar{ki}\) violation. The competition is now between the palatalized and centralized candidates. As expected, the former wins given the ranking NoCe\(\text{nal} \gg \text{NoPal}\). Tableau [18] illustrates.

[18]

<table>
<thead>
<tr>
<th>/kima/</th>
<th>*r/O</th>
<th>MAX-x</th>
<th>*ki</th>
<th>BinAss(F)</th>
<th>NoCe</th>
<th>NoPal</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ a. kima</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. kima</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. kima</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Things are different when the input contains an underlying \( r \) next to the velar. As mentioned, this cannot be maintained in the output [19a] due to \(*r/O\), so any other reasonable candidate will be lacking it. [19b] – which would be identical to the winner of [18], albeit for a different input – fails to present any lengthening as a means to express the trace left behind by /r/, so it violates MAX-x. The familiar [19c], but with lengthening, is still out due to \(*\bar{ki}\). The competition now focuses on [d] and [e]. It is now that BinAss(F) becomes relevant and rules out [19d], which presents triple feature association. The palatalized candidate thus fails, leaving room for the centralized one [19e] to emerge.

[19]

<table>
<thead>
<tr>
<th>/krima/</th>
<th>*r/O</th>
<th>MAX-x</th>
<th>*ki</th>
<th>BinAss(F)</th>
<th>NoCe</th>
<th>NoPal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. krima</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. krima</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. ki:ma</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Advantages

The representational account above is obviously advantageous over its major rivals. Contrary to Comparative Markedness, it offers a unifying solution to palatalization and centralization that promotes the conspiracy effect instead of missing the connection between the two. Contrary to Stratal OT, no need for re-rankings (let alone arbitrary ones) emerges. A single ranking provides for the full range of facts and no reference to any (morphological) levels is required.

This leaves us with Candidate Chains (CC). At a careful inspection, it should be obvious that this analysis is virtually identical to the account that this alternative would put forward (cf. Section 3.3), with the exception of the Prec constraint that is here instead replaced by BinAss(F). Like the CC account, the present proposal manages to capture both the opacity and the conspiracy phenomena within a single ranking without any unsubstantiated recourse to morphology. Unlike CC though, it eliminates the use of the undesirable Prec constraint which effectively stipulated the emerging opacity by imposing an arbitrary relationship between palatalization and r-deletion. BinAss(F) invokes no such relationship, but merely evaluates structures with regard to feature association and appears as a regulator as to which strategy will arise to avoid ki sequences. Given the general ranking *ki ≫ NoCentral ≫ NoPal, palatalization is the chosen remedy for ki sequences, unless blocked by the high-ranking BinAss(F), in which case centralization is preferred.

In short then, BinAss(F) gives us a representational way of understanding an opaque conspiracy. That its application is well-founded is supported by further evidence, discussed in the next section.

5. Justifying BinAss(F)

BinAss(F) is not totally unprecedented. McCarthy (2004) mentions span binarity as a possibility in passing, while Key (2007) uses such a span binarity constraint limited to tone. Neither however offers a more worked-out version, like the one in [16]. We will show that there are good reasons to introduce BinAss(F). Not only will it prove vital for the Samothraki Greek data at hand, but it will also find independent evidence in another set of data present in Samothraki (§ 5.1). Other Greek dialects, e.g. Cappadocian, support its existence too (§ 5.2). Beyond Greek, corroborating evidence can be found in tone languages like Ekegusii (§ 5.3).
5.1 Other evidence in Samothraki Greek

First, let us consider some additional data in Samothraki Greek. These involve words with a velar + r + front vowel + another vowel like the following examples:

**Input velar + r + front vowel + another vowel sequences**

[K, 71]

/aγrius/ [áγιρjus] *áγιus áγριος 'wild'
/kreas/ [krijas] *krás κρέας 'meat'
/axriastus/ [aξīrjastus] *aξt:astus σχείαστος 'unneeded'

In those sequences, instead of r-deletion and lengthening, as we would expect, we actually get r-metathesis to a coda position and centralization of the vowel. This lack of deletion and lengthening can be attributed to the fact that the otherwise anticipated forms include superlong vowel sequences that tend to be avoided (cf. Kavitskaya 2002, Topintzi 2006).

Interestingly, centralization arises in the absence of r-deletion. Two things are for sure; first, centralization cannot relate directly to the coda r, because underlying coda r does not have this effect, e.g. [aðirfós] and not *[aðίrfós] ‘brother’ (K, 58). Second, the presence of velars must be instrumental to centralization, because in sequences identical to those in [20], but with consonants other than velars, it fails to emerge.

**Input non-velar + r + front vowel + another vowel sequences**

[Marianna Ronga, p.c.]
/priakoni/ [piρjakón'] ‘jagged file used to sharpen knives’
/aletria/ [alétirja] ‘plough-pl.
/tria/ [tirjá] ‘three’

So, how are we to explain these facts? Topintzi (2006) argues that the data in [20]–[21] involve r-metathesis as a means to avoid onset r. Simple metathesis however would generate /aγrius/ → [a.γi.rus], meaning that r would still be in the onset. The r has then to be in a coda, implying that another consonant should serve as an onset; this is the palatal glide j, whose palatality we suppose comes from the underlyingly front vowel. The surface centralization of the vowel however is left undiscussed and unaccounted for in Topintzi (2006, 76), but finds a natural explanation in the present account. We claim that the result of the r-metathesis is in fact the following:

**r-metathesis**

\[ a \gamma r j u s \]

[cor]

This should be read as follows. Only [j] actually has to bear the feature [cor],
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because there is no back glide. Assigning [cor] also to [i] but not to the preceding consonant would violate *ki [23a]. Assigning it to both would avoid this problem, but it would generate another, namely a violation of BinASS[F] which now presents links to three positions [23b]. Consequently, we assign [cor] only to the glide, leaving the vowel unspecified, i.e. central and the preceding consonant intact, i.e. velar [22]. Introduction of BinASS[F] then accounts for various aspects of Samothraki Greek’s segmental phonology.

[23] Reasonable but incorrect outputs

\[
\begin{array}{c}
a \gamma i r j u s \\
\downarrow \\
[cor]
\end{array}
\quad
\begin{array}{c}
a \gamma' i r j u s \\
\downarrow \\
[cor]
\end{array}
\]

5.2 Cappadocian Greek

BinASS(F) proves useful in other Greek dialects too. Revithiadou et al. (2006) report that in certain Cappadocian dialects the vowels in the final two syllables are the same, a fact that is accounted for by means of bisyllabic harmonic spans at the right edge of the word.

[24] Cappadocian harmonic spans

/tesera/ [tésara] ‘four’
/anem-os/ [ánomos] ‘wind’
/faγ-o/ [fóγ-o] ‘eat.1sg.pres’

Importantly, the construction of these final spans is insensitive to morphological structure and to stress (mostly). It can thus be argued that Cappadocian imposes a real phonological requirement of identity in strictly binary domains that falls out naturally under the BinASS(F) view.

5.3 Ekegusii

BinASS(F) can also be utilized in instances of non-iterative spreading. This is a well-known phenomenon that refers to spreading of a feature or tone to the next syllable (or more generally unit), but not beyond that. For instance, in Lango (Nilotic, Uganda; Kaplan 2007), [+ ATR] spreads from the suffix to the last root-vowel, e.g. /bɔŋɔ̞-nì/ → [bɔŋɔ́nì] ‘your dress’. This type of ‘minimal’ spreading is easily analysed in rule-based theories by means of non-iterative rules. In OT, similar phenomena are difficult to be accounted for, because the constraint-types that induce spreading, such as Agree and Align always prefer total spreading rather than the bounded non-iterative one. A few approaches have been employed to deal with this phenomenon, including Comparative Markedness (McCarthy 2003), which however totally fails with regard to Samothraki Greek as shown previously. Another account is Positional Licensing (Zoll 1998; Kaplan 2007)
among many others) which claims that a feature is licensed in a prominent position and hence spreading to that position occurs as a response to licensing requirements, e.g. in Lango above, + ATR is licensed by the root, so it needs to spread there. Positional Licensing however has absolutely nothing to say about Samothraki Greek. Plus, it faces difficulties when it encounters data where non-iterative spreading occurs in spite of the absence of any prominence-inducing position. BiNAss(F) is especially suited for such cases.

Ekegusii, a Bantu language of Kenya, is seemingly an example of that sort, where H-tone that originates in the first syllable only spreads locally to the next tone-bearing-unit (presumably the mora, cf. káánera), but not beyond that.

[25] Ekegusii H-tone spreading to the next TBU (Bickmore 1997)
/kórá/ [kórá] ‘to do’
/kór-er-a/ [kóréra] ‘to do for’
/káán-er-a/ [káánera] ‘to deny for’
/símék-er-a/ [símékera] ‘to plant for’

6. Conclusion
Recent years have seen an on-going interest in the problem of opacity for Optimality Theory. Most authors have proposed that the only solution to this problem is a partial or even total return to a derivational view of phonology. Although this technically indeed solves many of the known opacity puzzles, we think that it also re-introduces some of the old problems inherent to derivationalism. This becomes apparent in the opaque conspiracy we have studied in Samothraki Greek. While most derivational analyses are able to technically deal with the opacity of these data, they bring back the conceptual problem of the conspiracy through the backdoor. We suspect that the solution will often be that a more meticulous inspection of the phenomenon involved will make the issues of the conspiracy and that of opacity disappear.

References
Key-words: opacity, conspiracy, Samothraki Greek, binary feature association, against derivationalism.