Chapter 5
OTHER PROPOSALS

In this chapter I consider other proposals for the analysis of segmental transparency. The first of the alternative analyses is one calling on the gapped configuration. I argue that this alternative is weaker than the sympathy-based analysis proposed in the preceding chapters, because the sympathy-based approach obviates the need for transparency-specific gapped representations and brings segmental transparency into the larger realm of derivational opacity, a widespread phonological phenomenon with independent need for explanation. In addition, a gapping account offers no explanation for the asymmetry in blocking versus transparent outcomes for segments. In contrast, with the evaluation metric for opacity effects in grammar (discussed in 3.6), the sympathy-based account correctly predicts that blocking will be a less ‘marked’ outcome than segmental transparency for segments that are (gradiently) incompatible with nasalization.

The second alternative I consider is the important representationally-driven account of nasal harmony proposed by Piggott (1992), where two different types of nasal harmony are posited. I argue that the fundamental advantage of the analysis of segmental transparency as an opacity effect proposed in the previous chapter is that it obtains a unified typology calling on only one basic type of nasal harmony. In addition, the unified analysis eliminates the need for any ad hoc representational assumptions. Finally, obviation of the gapped representation in the sympathy-based account offers an argument against further alternatives producing effects similar to gapping, such as violable feature expression or embedding of feature domains, which require parochial constraints to obtain segmental transparency.

5.1 A gapping alternative

I begin by considering an alternative calling on a violable NOGAP constraint, as in (1). This constraint prohibits linkage of a feature specification across an intervening segment. Because it is posited as violable in the alternative, which I will call the ‘gapping approach’, feature linkage may skip segments when compelled by a higher-ranked constraint.

(1) NOGAP
   * \( \alpha \beta \gamma \) / \( \backslash \) / [F]
   where \( \alpha, \beta, \) and \( \gamma \) are any segment

In nasal spreading contexts, NOGAP conflicts with the nasalized segment constraints. If NOGAP is dominated by a nasalized segment constraint, two outcomes are possible, either skipping of the segment for which nasalization is banned or blocking by this segment. The blocking outcome comes about if NOGAP dominates SPREAD[+nasal], as shown in (2) with a hypothetical form. Constraints against nasalized obstruents are collapsed here, as are constraints against nasalized sonorants.

The bracketing in candidate (c) indicates that the [+nasal] linkage gaps across the [t]. Candidate (d) shows gapping across [t] and [l]. Here candidate (a), which respects both *NASOBS and NOGAP, wins over its competitors in (b-d), which fare better on spreading.

(2) Blocking: NOGAP >> SPREAD[+nasal]

<table>
<thead>
<tr>
<th>Candidate</th>
<th>*NASOBS</th>
<th>NOGAP</th>
<th>SPREAD[+nasal]</th>
<th>*NASSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [â]tala</td>
<td>!</td>
<td>!</td>
<td>****</td>
<td>!</td>
</tr>
<tr>
<td>b. [âtâlâ]</td>
<td>!</td>
<td>!</td>
<td>****</td>
<td>!</td>
</tr>
<tr>
<td>c. [â][t][lâ]</td>
<td>!</td>
<td>*</td>
<td>*</td>
<td>****</td>
</tr>
<tr>
<td>d. [â][t][â][l]a</td>
<td>!*</td>
<td>**</td>
<td>***</td>
<td>**</td>
</tr>
</tbody>
</table>

The tableau in (3) shows the skipping outcome. Here the reverse ranking of NOGAP and SPREAD[+nasal] holds. Once again, *NASOBS is respected in the winning candidate. Since SPREAD now dominates NOGAP, the winner, in (c), is the one which spreads [+nasal] to all of the segments except the obstruent. Note that candidate (c) incurs only one spreading violation. This is because in this form there is a single [+nasal] feature specification linked to all of the segments except [t], which is skipped. The candidate with blocking in (a) loses on SPREAD. We may observe that candidate (d), with skipping of both [t] and [l], loses by virtue of an extra spreading violation. In the optimal output, any segments whose nasalization constraints are dominated by SPREAD[+nasal] will undergo nasal spreading.

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The constraints and ranking shown in (4) illustrate a ranking in which all consonants behave transparently and vowels undergo nasalization. In the tableau in (4), constraints banning nasalized approximant consonants (collapsed here) move up to dominate NOGAP. This produces transparency of both [t] and [l] in the optimal output, an outcome which was not found in the cross-linguistic survey of nasal harmony. To limit transparent outcomes to obstruents alone, the gapping approach would require the fixed ranking in (5), which stipulates that NOGAP must always dominate *NASLIQUID (and by implication all lower-ranked nasalization constraints). NOGAP could then be computed by considering nasalization constraints, but the approach in (5) does not call on the gapped configuration. Instead, the gapping approach requires an entirely different mechanism to obtain opaque effects. In particular, the ranking in (5) ensures that only obstruents can undergo transparent nasalization, which is in line with the cross-linguistic evidence. The problem with this account of the limited set of segments that may behave transparently is that it does not offer any explanation for this limitation. The restriction of transparency to obstruents might be due to the higher computational cost of nasalization for vowels, making it less likely to occur in the optimal output.
The variable dependency hypothesis

In his important cross-linguistic study of nasal harmony, Piggott (1992) makes an interesting proposal: there is not one but two types of nasal harmony in the languages of the world. The two types of nasal harmony patterns he posits have the following different properties. In the blocking pattern (Piggott's 'Type A') segments are divided exhaustively into sets of targets or blockers; there are no transparent segments. The blocking segments are a subset of obstruents, with hierarchical variation in the set of targets according to the implicational hierarchy outlined in chapter 2.

On the other hand, in the transparency pattern (Piggott's 'Type B'), all segments are divided into sets of targets or transparent segments — no segments block spreading. Transparent segments are obstruents and the remaining segments are targets; voiced stops may belong to the latter set.

Piggott's proposal that there are two different kinds of nasal harmony is driven by his theoretical grounding. Piggott assumes a representationally-driven, feature-geometric approach, and he adopts a constraint hierarchy for nasal harmony. This hierarchy is represented in (6) for Piggott's analysis of Southern Barasano (Tucanoan; Colombia). ('R' represents a root node.)

(6) Transparency in Spontaneous Voicing (SV) node spreading

In the majority of languages with the transparency kind of nasal harmony, voiced stops undergo nasal harmony. Since [nasal] can occur only in the representation of sonorants in these languages, Piggott suggests that nasal harmony involves the nasalization of sonorants, which he represents in (5) for Warao, a language of Venezuela.

In the case of the blocking type of nasal harmony, rather than expanding with context-dependent nasal or oral realizations, obstruents always belong to the set of blocking segments. This is shown in (7) (From Piggott 1992: 38 on Warao).

In summary, Piggott's proposal that there are two different kinds of nasal harmony is driven by his theoretical grounding. Piggott assumes a representationally-driven, feature-geometric approach, and he adopts a constraint hierarchy for nasal harmony.
Variability in the set of blockers is analyzed as variability in the set of segments which are specified underlyingly for the Soft Palate node (governed by Piggott's Contrastive Nasality Principle). This set will be a subset of the consonants which includes the obstruent stops.

A driving force behind Piggott's analysis is the assumption that transparency occurs when a segment is skipped. With this assumption, Piggott argues that the transparency systems cannot be unified in a single theory that predicts harmony or blocking, because if transparency were the same for all languages, the spreading of the Soft Palate node would then be expected to undergo harmony rather than blocking.

2 Piggott thus posits two types of nasal harmony which differ in the node that spreads and in the dependency of [nasal]. Given the theoretical grounding in the assumptions of the parametric dependency account, and the empirical evidence for the distribution of blocking behavior of stops to the inventory of the stop nodes, the spreading of stops might be considered an instance of the spreading of the Soft Palate node.

Section 2.3 concerns the details of the connection between inventory structure and harmony type. Piggott suggests that when voiced stops are present, the inventory structure is predicted to influence the spreading of the Soft Palate node. When there is no contrast in an inventory, [nasal] is relevant for sonorant segments only, i.e. under these circumstances, [nasal] is predicted to spread.

Epena Pedee stops

\[
\begin{align*}
\text{a. } /p\text{er}o)\text{Ra}\text{.} & \quad /[\text{peR'o)\text{R'a}}]\text{.} \\
\text{b. } /n\text{a)we}\text{.} & \quad /[\text{na)w'e}]\text{.} \\
\text{c. } /\text{mb}\text{u}si\text{.} & \quad /[\text{mbu}si]\text{.} \\
\text{d. } /w\text{a)h}i'da\text{.} & \quad /[w\text{a)h)i'<da] \text{.} \\
\text{e. } /k\text{Hi'sia}\text{.} & \quad /[k\text{Hi'<si}´] \text{.} \\
\text{f. } /h\text{o)mHe}\text{.} & \quad /[h\text{o)mpHe}]\text{.} \\
\text{g. } /w\text{a)i'tHee}\text{.} & \quad /[w\text{a)i'<tHee}] \text{.}
\end{align*}
\]

The problem that Epena Pedee presents for the parametric dependency account concerns the details of the connection between inventory structure and harmony type. Piggott suggests that when voiced stops are present, the inventory structure is predicted to influence the spreading of the Soft Palate node. When there is no contrast in an inventory, [nasal] is relevant for sonorant segments only, i.e. under these circumstances, [nasal] is predicted to spread.
5.3 Other approaches to segmental transparency

Some recent approaches to segmental transparency in an optimality-theoretic framework move away from claims about the feature specification. An empirical question in the literature is whether the occurrence of nasalization or nasal harmony in a language is driven by markedness constraints; for one kind of segmental transparency, this complementarity is a flag that target and transparent segments are different realizations for one kind of segmental patterning, namely undergoers of nasal harmony.

The variable dependency analysis is faced with two more general kinds of drawbacks. The first point concerns the ad hoc nature of the assumptions about inventories. These constraints do not arise within the grammar, but are set up as variables in the analysis. The second point concerns the generalization, which requires a constraint to be set up in each language, and this constraint generalizes to other contexts. The variable dependency analysis assumes that nasal harmony can undergo nasalization and nasal spreading, and this can be achieved in two ways. First, nasal spreading can be achieved by a constraint, *NASOBSSTOP. Second, nasal spreading can be achieved by a constraint, *EMBED, which prohibits the occurrence of a root node parsed into a feature domain embedded within another of an opposing specification; for example, *EMBED[-nasal] bans the occurrence of [-nasal] within a span of [+nasal] segments. This is illustrated by the representation in (10).

(10) An embedded feature domain structure:

\[ [+N \text{w)a} ] \quad [-N \text{t}] \quad i' \]

The structure in (10) will incur one violation with respect to \(*EMBED\[-nasal\] for the occurrence of [-nasal] [t] within the [+nasal] span of segments from [w)a] to [i']. The violation of \(*EMBED\) can be compelled by a segmental markedness constraint, such as \(*NASOBSSTOP\), and the constraint of EXPRESSION, which requires that a phonetic feature \([F]\) must be expressed on every element in an F-domain. This kind of segmental transparency posits the domain of [+nasal] as spanning the entire word [+Nw)a)ti', with EXPRESSION violated by [t], again driven by the markedness of nasalizing this segment.

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capture a broader range of phonological phenomena, for example, if the notions underlying embedding or feature expression could be elaborated to extend to other kinds of derivational opacity, then this would be an interesting alternative to pursue, and one generally in harmony with the analysis proposed here.

In his recent analysis of vowel harmony, Pulleyblank (1996) also argues against using an ad hoc representational configuration, such as gapping, to obtain segmental transparency. The representations...the vowel features should be linked to the consonants as well, see Ní Chiosáin and Padgett 1993, 1997 for discussion.)

(11) Representation of segmental transparency in [RTR] harmony

|             |        /    \
| t  E  k  k  i  l  E  E  n |

To realize this kind of outcome, Pulleyblank does not analyze segmental transparency as a kind of derivational opacity, rather he proposes to interpret violations of the constraint driving spreading in a different way. Consider the representations in (12). The set of segments to which [+nasal] i could potentially be linked without producing line crossing are (A-E); these are the 'local domain' for this occurrence of [+nasal]. Segment (G) is not in the local domain for [+nasal] i since linking this feature occurrence to (G) would produce an ill-formed representation. (Chomsky 1995).

(12) Local domains

a. [+nasal] i      [+nasal] j
b.     [+nasal] i  [+nasal] j

What this means for spreading is that sprouting feature occurrences on the other side of a transparent segment can fair better on alignment than a blocking outcome. Evaluated with respect to local domains, (13a) with spreading will incur one violation on rightward spreading for [+nasal], but (13b) with blocking will incur two violations.

(13) Local domains in nasal spreading

a. 

b. 

Pulleyblank's approach to segmental transparency is a very interesting one, and of the alternatives, it is most closely in harmony with the understanding of locality argued for in chapters 2 and 3. In...opacity offer no insight into why blocking of spreading is a more common outcome of the nasals, as well. NE Chomsky and Papert 1999.