CONCLUSION

This dissertation has argued that there are no truly noniterative phenomena in phonological grammars. That is, every seemingly noniterative phenomenon exhibits emergent noniterativity. Even the best examples of noniterativity—Lango's vowel harmony, Chamorro's umlaut, tone spread/shift, and postlexical spreading—are analyzable in terms that do not invoke noniterativity. These re-analyses are not merely convenient hacks, either. They reveal deeper insights into the motivations behind ostensibly noniterative phenomena and open new areas of inquiry. For example, it was argued in Chapter 3 that Chamorro umlaut is driven by a desire to place pretonic [–back] features in the root. The analysis is centered on the claim that these pretonic syllables are weak, as evidenced by their inability to host stress. In addition to providing an explanation for Chamorro's typologically unusual prefix-to-root spreading, the analysis points out the need for theoretical and experimental investigations of both the extent of and reasons for the language's pretonic weakness. The peak delay approach to tonal noniter-ativity highlights a gap in our empirical understanding of these phenomena, and only more work like that of Myers (1999, 2003) can determine the viability of Peak Delay Theory.

It is interesting to note that Positional Licensing plays a large role in two of the four kinds of phenomena discussed here. This is most likely a coincidence. Lango

and Chamorro exhibit very similar phenomena, with affixes' features spreading to the root. It is therefore not surprising that they submit to similar analyses. There is no *a priori* reason to expect all cases of emergent noniterativity to comprise a single natural class of related phenomena, so it is not surprising that the list of factors that can produce emergent noniterativity is diverse. Chapter 1 presented a partial list of the factors that can lead to the appearance of noniterativity, with an assortment ranging from positional effects to binarity requirements. Positional Licensing may play a large role in the typology of emergent noniterativity, but it seems more likely that it is just one of many formal mechanisms that can, in the right circumstances, lead to what looks like noniterativity. Evidence that this is so is found in Chapter 4, where it was argued that constraints on phonetic implementation can produce (what seems like) noniterative tone spread and shift, and Chapter 5, where it was argued that NONFINALITY can lead to seemingly noniterative phenomena at the postlexical level. PEAK DELAY, NONFINALITY, and Positional Licensing are formally distinct kinds of constraints, but in the right contexts they can produce similar effects. None has a monopoly on noniterativity.

There is, however, a common theme throughout the cases of of noniterativity discussed in the preceding chapters. Often, the constraint that motivates spreading is satisfied after one iteration of spreading. This was the case in Lango, Chamorro, Nez Perce, and the Optimal Domains Theoretic analysis of tone spread/shift. Once this markedness constraint is satisfied, lower-ranking faithfulness constraints step in to prevent further spreading.

This dissertation has focused on assimilatory phenomena, and it is of course necessary to test the Emergent Noniterativity Hypothesis against other phenom-

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ena, such as dissimilation. Foot and stress assignment were mentioned briefly in Chapter 1, where it was pointed out that phonologists generally agree that noniterativity in that domain is attributable to edge alignment, not explicit non-iterativity requirements.

The dissertation opened with the observation that OT and rule-based phonology differ markedly in their handling of processes, and therefore in their treatment of noniterativity. While rule-based theories are well equipped to produce true noniterativity (via iterativity parameters and the like), OT cannot produce true noniterativity because markedness constraints are not permitted to access the input. This seems *prima facie* like a problem for OT since natural language is filled with phenomena that occur exactly once per output form. Noniterativity is therefore like opacity[1] (e.g. McCarthy 1999 and many papers in Roca (1997), to name just some of the relevant work) and the too-many-solutions problem (Blumenfeld 2006, Steriade 2001) in that it presents no problems for rule-based phonology[2] but potentially represents a major stumbling block for OT. Opacity and the too-many-solutions problem have been used to argue for radical changes to OT's architecture (e.g. Blumenfeld 2006, McCarthy 1999, Rubach 1997) and even for the abandonment of OT altogether (e.g. Idsardi 1997, Paradis 1997). Noniterativity has the potential to join these other phenomena as a mark against OT.

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[1]In fact, noniterativity can be viewed as just a special kind of derivational opacity. Opacity is problematic for OT because OT lacks the intermediate stages that must be referenced to explain the appearance of a non-surface-true generalization. Similarly, OT bans markedness constraints from making reference to an early derivational stage—namely the input—that is crucial to the evaluation of noniterativity.

[2]But see Baković (2007) for an argument that rule-based theories don't handle opacity as well as is typically thought. McCarthy (2008) also points out that too-many-solutions is just as problematic for rule-based phonology as it is for OT.

But noniterativity is only a problem for OT if it is actually attested in natural languages. The investigations in this dissertation suggest that it is not, and therefore the tables are turned. It is a mark in OT's favor that it cannot produce noniterativity, and doubt is cast on rule-based theories because they overgenerate. Thus noniterativity differs from opacity and the too-many-solutions problem in two ways: (i) the "repair" for OT is simple (let markedness constraints access the input), and (ii) the repair is unnecessary because noniterativity is not actually attested.

To frame the issue in a different way, an investigation of noniterativity probes the status of processes in phonology (cf. Nevins & Vaux 2008b). In rule-based phonology, grammars are composed largely of processes (as encoded in rules), but in OT, processes are epiphenomenal products of constraint interaction. Therefore the former can directly impose formal restrictions such as noniterativity on processes while the latter cannot. Since noniterativity is a property of processes, not constraints or representations, only a theory that includes processes can impose noniterativity. The implication of this dissertation, then, is that since grammars cannot require noniterativity, processes are not formal constructs in phonology. This view favors OT over rule-based phonology.

From an OT perspective, the ENH should not be unexpected. The best OT constraints are those that further an independently justifiable cause, such as maintaining lexical information (faithfulness) or promoting articulatory ease and perceptual salience. But what would justify a constraint that requires noniterative spreading? For (iterative) vowel harmony, we can point to the articulatory simplicity that is achieved when a sequence of vowels shares some property. Or we

can point out that articulatory and acoustic properties may bleed from one vowel to surrounding vowels, and vowel harmony is the phonologization of this tendency. But what motivation could possibly exist for a system in which a feature spreads exactly once? Perhaps it is articulatory or perceptual ease. Spreading a feature from one host to the next doubles the feature's domain and increases the odds that the corresponding gestural target will be met and that listeners will perceive the feature. But if spreading once is good for these reasons, spreading more than once should be even better. In a metaphorical sense, then, noniterative spreading is harmonically bounded by iterative spreading, from a functional perspective.

An example from Lango makes the point concrete. The form *bòŋónî* 'your dress' is derived from the input /bòŋɔ́-nî/. What purpose does spreading serve in this case, under the assumption that this is a truly noniterative version of vowel harmony? The output is no more harmonic than the input. Both contain two matching vowels and one non-matching vowel, and the surface form actually disrupts the underlying root harmony. Shoehorning Lango's assimilation into the noniterative vowel harmony mold makes it appear bizarre because there is no clear motivation for the spreading.

In many versions of rule-based phonology (e.g. Grounded Phonology (Archangeli & Pulleyblank 1994)), iterative and noniterative rules differ just in the setting of an iterativity parameter or the equivalent. The two kinds of rules are equally easy to formalize, so this kind of theory incorrectly predicts that true noniterativity should be just as common as iterativity. In fact, in *SPE*, iterative rules are much more complex than their noniterative counterparts (remember that iterativity relies on the parenthesis-star notation in *SPE*), so this theory predicts an

asymmetry in the wrong direction.

How can rule-based phonology be adapted to reflect the ENH? A simple solution is possible: Another way to frame the conclusion that there are no truly noniterative phenomena is to say that every process is in principle iterative. Thus we can do away with iterativity parameters and issue a theory-wide proclamation (along the lines of the No Crossing Constraint (Goldsmith 1976)) that every rule applies iteratively. Those that do not appear to do so are consequently instances of emergent noniterativity in the sense of Chapter 1. This move, as far as I can see, would achieve the correct results. But it is just a patch. Whereas the absence of true noniterativity is a direct consequence of OT's output-oriented evaluation system, it comes from an arbitrary stipulation in the rule-based revision suggested in this paragraph. It remains a mystery that the stipulation calls for universal iterativity and not universal noniterativity, or that the stipulation exists at all. Even though rule-based phonology can be amended to account for the absence of true noniterativity, it remains conceptually inferior to OT on this point.

Furthermore, an iterativity parameter doesn't shed light on why some processes are noniterative and others aren't. Examining seemingly noniterative phenomena from the perspective of OT forces us to seek a motivation for noniterativity because we have no recourse to an iterativity parameter. When a process applies just once in OT, it is because some output requirement prevents or does not require further spreading, not because an arbitrary prohibition stops it from applying again.

I wish to close the dissertation with a speculation. In the face of the ENH, we might ask how rule-based theories came to predict true noniterativity if the phe-

nomenon is actually unattested. From my current perspective I see two possible parts to the answer. First, self-feeding rules are easy to write and are desirable in any rule-based system because of their utility in phenomena like vowel harmony. Without major constraints on what a well-formed rule is, then, rule-based theories predict true noniterativity from the start. Moreover, when confronted with iterative phenomena like vowel harmony, rule-based theories must adopt an iterativity parameter or the equivalent so that certain rules can be marked as applying exhaustively to their own outputs. Once this formal accommodation is made, true noniterativity is an unavoidable byproduct. The self-feeding rules that are not flagged as iterative produce true noniterativity. To my knowledge there are no satisfactory theories of what kinds of rules may be iterative and what kinds may be noniterative, although Howard (1973) attempts to build to such a theory and finds varying degrees of success.

Thus the prediction of true noniterativity arose through the natural course of rule-based phonology's evolution. The conclusion that this prediction is wrong does not mean that the linguists who developed rule-based phonology carelessly overlooked an obvious generalization. Rather, the ENH reminds us that while it is important to build new theories on the insights of their predecessors, reevaluating old assumptions from the perspective of our new theories is also a valuable exercise.