7:

CONCLUSION

In the course of this work, we have set out and conducted a programme of formal theory comparison for derivational phonology and optimality phonology, finally setting up a new system that successfully responds to the empirical issues raised in the course of the study.

The enterprise of formal theory comparison examines how similar theories are structurally, an approach distinct from comparisons of data, substance and semantics. The two theories we were interested in employed generation systems and evaluation systems, and we sought to compare these while avoiding such formal red herrings as the blocking of rules, and the Generator function found in expositions of Optimality Theory. These foundational considerations were established in the first two chapters.

Derivational phonology and optimality phonology are comparable on three fronts: rule operations and Faithfulness constraint violations; serial rule interaction and evaluative constraint interaction; derivational sequences and harmony scales. In each case, the correlation breaks down and pertinent data emerge. The Duke of York gambit proved to be a recurring issue in all of them, and we comment on this further below.

A synthesis of the two systems was demonstrated in chapter six. It places an ordering on constraints which acts both as a serial order and a rank order. This maximises descriptive coverage of the interactions that are possible between phonological constraints in the world's languages. The theory matches all the empirical requirements that emerged during the formal comparison in earlier chapters, but also puts interesting limitations of its own on opacity effects, such that neutralisation is normally transparent.

7.1 The Duke of York Gambit

Of recurrent significance in this work has been the “Duke of York gambit”, so named by Pullum (1976). Formal comparison has clarified the nature of the Duke of York gambit, and a fresh evaluation of its merit has been given here. It has often appeared suspect to phonologists, and we have argued (3.4.2) that it is problematic because it fails to explain why alternant forms are similar when they are. We have also argued from empirical evidence that the Duke of York gambit is not used in natural language, except in some subcases. For, if the Duke of York gambit were possible, then we would predict languages where vowel deletion and vowel insertion caused the vowel inventory to collapse to one vowel in some contexts. But this never happens: instead, vowel deletion and vowel insertion apply in disjoint contexts, as seen in Yokuts, Chukchee and Lardil (3.4.4).

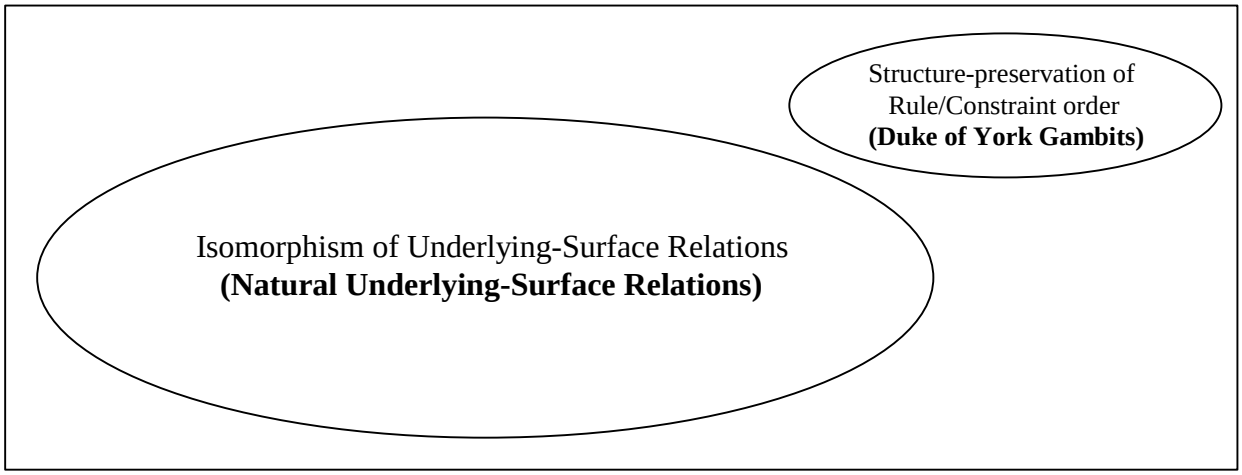
In fact, the Duke of York gambit is pivotal to the entire formal comparison. We showed that Duke of York derivations exceed definable 'naturalness' properties applicable to the formal structure of derivations:

- Duke of York gambits are prime examples of derivational subsequences that are **unorderable** since they contain a repeated element (see chapter five),
- Some Duke of York gambits, those which destroy inserted material, constitute **non-cumulative** derivations which cannot be replicated by multiple changes at a single step and the serial composition of the mappings of the two contrary operations is not **representative** of the two component steps (see chapter three).
- All other Duke of York gambits are not **veritable**, because the resulting structure is identical in some respect to the original but this is left as an accident of the system, whereas leaving the structure unaffected would have satisfactorily explained the before-and-after resemblance (see chapter three).

In contrast, the input-output correspondences and harmony scales of constraint evaluation systems are well-behaved in these respects. So mappings like insertion-deletion do not arise in a one-step input-output theory, and mappings like deletion-insertion, are always filtered out as containing excessive Faithfulness constraint violations. A Duke of York derivation can never be isomorphic to an input-output mapping; equivalently, if we consider all the possible pairings of rewriting systems and evaluating systems that have isomorphic underlying-surface relations, Duke of York derivations are not among them. Duke of York derivations may derive the same *results* as some of these systems which lack them, but the gambit exceeds the naturalness properties that these other systems share.

It is considerably ironic, then, that whereas the Duke of York gambit is mismatched with constraint evaluation in terms of its mapping structure, it is actually the place where rule ordering and constraint ranking match up: whereas the rule whose outcome supersedes the other is ordered later, the analogous constraint whose effect supersedes the other is ranked higher. Hence, there is no common ground between the correlation of rule ordering and constraint ranking (the Duke of York gambit cases) and systems that have isomorphic underlying-surface relations. A Venn Diagram (1) puts this lack of common ground into graphical form.

(1) **Venn Diagram** over the space of pairs of generation systems and evaluation systems:



(1) represents the overall conclusion of our formal comparison of the derivational framework and the optimality framework: that while substantial **correlations** exist between the two systems in terms of the mapping between underlying and surface structures, and in terms of rule interaction and constraint interaction, the fact that these connections are mutually exclusive means that at no point do the two systems **mimic** each other in full. And the Duke of York gambit is precisely where this lack of mimicry is demonstrated, for just at the place where rule/constraint interaction converges, the underlying-surface relation diverges.

7.2 A New Synthesis

Constraint Cumulation Theory vindicates the formal comparison enterprise. Developed as a formal integration of serial order and rank order, its predictions match the empirical record at many points, deriving examples of overapplication, mutual interdependence, default, reprosodification, reversal in absence of conflict, prespecification, chain shifts, processes confined to derived structure, subtractive morphology, stability effects, and multiple overapplication. These patterns depend on an interaction between Markedness constraints, added cumulatively, and Faithfulness constraints which not only regulate each step of the derivation but also measure the retention of underlying specifications. This brings together the insights of derivational phonology and optimality phonology.

Providing more than a consolidation in descriptive coverage, desirable though that is, Constraint Cumulation Theory also excludes unattested Duke-of-York derivations while accommodating attested subtypes, and limits the ways in which neutralisation can become opaque:

(2) **Transparency of Neutralisation Hypothesis** (6.2.4)

> Contextual neutralisation, and phoneme elision, occur if and only if the context in which they occur is present in the actual surface representation, *except* when neutralisation is caused by assimilation to a phoneme that is deleted.

This offers a fresh insight into the traditional distinctions between neutralisation and conditioned variation, and between elision and epenthesis. It also invites further investigation: if neutralisation and deletion are constrained from becoming opaque, do other processes *always* become opaque where possible? For example, given Eastern Massachusetts English *fear* [fiː.jə], is it plausible that a variety of English could exist where epenthesis did *not* overapply with respect to *r*-deletion, leaving *fear* homophonous with *fee* [fiː]? Or is epenthesis inevitable in this context? Another issue is that phonetic studies of some cases of neutralisation have suggested that neutralisation is not phonetically complete, perhaps suggesting that neutralisations should not be dealt with by the discrete, categorial features of phonology at all (Port and Crawford 1989, but see Fourakis and Iverson 1984 for a dissenting view). The view presented here must be evaluated against this alternative.

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