Paradigms in phonological theory

Introduction

In the second half of the nineteenth century the German Neogrammarians tried to reconstruct the words of the Proto-Indo-European language, subjecting themselves to an immense level of scientific rigidity. They claimed that all cognates can be derived from the proto-languages by applying the various sound laws they discovered or hoped to discover through their research. But not all the words behaved as expected according to these sound laws, and some of the Neogrammarians then applied paradigmatic relationships as a possible explanation for the obvious exceptions. Either a word violated the sound laws in order to maintain its formal similarity with the other members of the paradigm (this is now called “paradigmatic uniformity”) or it violated the laws in order to be different from the other members of a paradigm and avoid homonymy (this is now called “paradigmatic contrast”).

From the outset this invocation of paradigmatic relationships invited severe criticism. Since paradigmatic relationships were only applied when something did not go according to plan, they appeared to be some kind of catch-all device. Almost anything could be explained that way when it had to, and as such the concept had very little explanatory power. On the other hand, the idea that paradigmatic relations have an effect on language change could not easily be dismissed just on the grounds that the principles by which they are applied are too complex to be described. Therefore, in the century following the days of the Neogrammarians, the discussion of paradigmatic influences on phonological change was quietly put to rest, but the concept was applied here and there without any principled consideration of its methodological adequacy. Some phonological theories, such as Generative Phonology as developed by Chomsky and Halle, did not allow any place at all for paradigmatic effects.

It is the rise of Optimality Theory (OT) which reopened the discussion of paradigmatic effects in phonological theory, and this book offers a snapshot on the state of the discussion a good decade into the development of the model. Paradigms in Phonological Theory attempts to find new answers on the old questions which have already been asked in the times of the Neogrammarians:
Are there any robust criteria which allow predictions on when and to which extent paradigmatic effects are allowed to have an influence on the outputs of phonological processes? If so, how can they best be described? What is the place of these paradigmatic effects in a constraint-based model?

Chapter Summaries

The book is a collection of papers by various scholars working on the subject within the framework of Optimality Theory. Some of the papers are theoretical in nature, while others are based on data from individual languages.

The first chapter, *Introduction: The Role of Paradigms in Phonological Theory* by the three editors of the book is a short summary of the problem posed by paradigmatic relationships, beginning with the Neogrammarians. It includes a short presentation of the two principal ways in which various scholars have tried to deal with paradigmatic effects in Optimality Theory. The first way, called *Base Priority*, applies identical sets of ranked constraints, including at least one which favors identical outputs, to the various stages of a derivational process, in which each stage leads to a well-formed phonological word; an example is *origin – original – originality*, where the irregular stress pattern of *originality* is explained as a paradigmatic effect caused by the stress pattern of its immediate base *original*. In this model, each derived output is based on a well-formed word which serves as the input of a derivation. The second way, called the *Symmetrical Model*, does not see single words as inputs, but whole paradigms, which then get evaluated and modified by the various ranked constraints, at least one of which again would prefer uniform outputs for the whole paradigm. The first model appears to have been applied more successfully for derivational paradigms, and the other for inflectional paradigms, but the authors of chapter 1 leave little doubt that they see the bigger promise with the *Symmetrical Model* as a general approach to dealing with all kinds of paradigmatic effects. In spite of this apparent preference of the editors, the various contributions of the book follow variations of one or the other of the two introduced models.

The only exception to this is Adam Albright’s *The Morphological Basis of Paradigm Leveling* (chapter 2). The point of his paper is to show that although purely phonological explanations of paradigmatic effects may be sufficient to describe what is going on, they by no means can serve as an explanation. He explains this around a particular problem of Latin morphology – the alternation of some nouns ending on oːs in the nominative singular, which get changed to or in the classical period of Latin under the obvious influence of oblique case forms of these nouns which already had an r as the final stem vowel. Albright claims that a phonological explanation like the symmetrical model mentioned above cannot provide a good answer to some important questions: Why are only a small number of nouns affected by this change? Why did the change not go the other way round, from the less morphologically marked form (nominative) to the more marked forms (oblique cases)? He argues that the motivation for the change is mainly rooted in morphology – the learners of the language trying to identify base forms of each noun by evaluating each option according to the information at hand: predictability of correct noun forms, the behavior of similar looking nouns, and the behavior of nouns in other paradigms. Albright uses a computational model which evaluates the available options for base forms in Latin, which reveals that the oblique cases provide a much more reliable base form for nouns than the
nominative. The same model also provides explanations for the speakers sometimes preferring s forms or r forms for the nominatives of different noun types. The change from s to r on some nouns is then seen as an over-generalization of the slight preference for r found in the nouns of that particular type (polysyllabic non-neuter nouns).

In the third chapter, *Competing Principles of Paradigm Uniformity: Evidence from the Hebrew Imperative Paradigm*, Outi Bat-El undertakes an OT analysis of certain phenomena in the Imperative paradigms of different stages of Hebrew (Colloquial Hebrew and Tiberian Hebrew). A uniform paradigm would ideally derive all forms B from a form A, have all Bs identical in their form to As, and have a counterpart B to each A. These three principles compete with the different markedness and faithfulness constraints of the language. Bat-El illustrates the different ways in which the forms of the imperative paradigms work out in colloquial and Tiberian Hebrew. Uniform and non-uniform paradigms result from the different rankings of constraints, which to varying degrees require the violation of some of the paradigm-uniformity principles.

Luigi Burzio’s contribution, *Sources of Paradigm Uniformity* (chapter 4), looks at the problems created by the inclusion of OUTPUT-OUTPUT-FAITHFULNESS (OO-F) into the inventory of OT constraints. Rejecting cyclic applications of phonological rules (and therefore base-priority approaches to paradigm uniformity), he outlines a model that explains how different outputs of phonological or morphological processes attract each other to create optimal forms based on faithfulness to each other. A crucial factor, which in the words of Burzio “modulates” the ranking of OO-F is distance, the perceived accumulation (or lack thereof) of common features between two representations. Burzio continues by claiming that in morphology all forms can be accounted for by the different rankings of phonological markedness, INPUT-OUTPUT-FAITHFULNESS (IO-F) and OO-F. Beyond that, Burzio makes some very strong statements on the nature of morphology and phonology as such, claiming that both can be handled without reference to the traditional notions of derivation and underlying representations, to the point that he says “Morphology is OO-F” (p.106).

Chapter 5, *Capitalistic vs. Militaristic – the Paradigm Uniformity Effect Reconsidered* by Stuart Davis, is a very well-written argumentation against one of the show-cases of Functional Phonology (Steriade 2000), claiming that phonology can be reduced to the works of human motor behavior and perception and should not make any references to abstract units such as the phoneme. Steriade’s example involved the apparent minimal pair capitalistic vs. militaristic, in which the two words appear to have the same stress pattern, but have two different varieties of [t] at the beginning of the third syllable, the flap [ɾ] in capi[ɾ]alistic, and [tʰ] in mil[i]tari[ɾ]istic. Steriade sees this as the work of a non-contrastive feature in phonology, caused by paradigm uniformity effects in the case of militaristic, where otherwise the flapped variant would have to be expected. Davis convincingly argues that the state of affairs is different: English words usually have aspirated [tʰ] in that position, but the appearance of the flap in capitalistic can only be explained as a paradigm uniformity effect with respect to the foot-structure of capital. The appearance of different non-contrastive features in a similar environment can be explained by the phonetic effects of a contrastive feature (foot-structure), and Steriade’s case for non-contrastive influences on phonology is therefore significantly weakened.
Laura Downing investigates a problem in Bantu languages, with data mainly from Jita, Bemba, and Kinande, in chapter 6, *Jita Causative Doubling Provides Optimal Paradigms*. Causative doubling, in conjunction with spirantization, is a feature known from many Bantu languages. It has attracted cyclic analyses, but Downing shows that these analyses leave important problems unresolved. As a better alternative she presents McCarthy’s *Optimal Paradigm* approach (chapter 8 of this book), which sees paradigms as constellations of neighboring outputs of morphological processes. Causative doubling and spirantization create a particular string for causative morphemes which is then the target of an Output-Output Faithfulness constraint working in these languages.

Chapter 7, *Paradigmatic Uniformity and Contrast* by Michael Kenstowicz, is a collection of anecdotal evidence for paradigm phenomena in various languages. It begins by explaining an unusual distribution of Spanish diminutive morphemes by claiming paradigm uniformity effects in this situation. The rest of the chapter, however, is a convincing presentation of data that paradigm effects do not always result in uniformity, but to the contrary may achieve greater paradigmatic contrast. In cases where phonological rules threaten the neutralization of important morphological distinctions, languages employ repair devices which in various ways reestablish these contrasts. Kenstowicz provides examples from Russian, Bulgarian, Chi-Mwiːni, and Arabic, with a great allotment of space for the latter, showing how different Arabic dialects choose different repair strategies to prevent the ubiquitous neutralization of the 3rd person feminine morphemes with 1st person singular and 2nd person masculine morphemes in certain verbal paradigms.

In chapter 8, John McCarthy presents his model of *Optimal Paradigms*, which was already referred to by Laura Downing in chapter 6. The basic idea is that whole paradigms are seen as candidates in an evaluation, and depending on the ranking of Output-Output-Faithfulness constraints, paradigmatic effects take hold. If they do, McCarthy comes up with a number of strong predictions: optimal paradigms only result from over-application of OO-F constraints, never from under-application; optimal paradigms always favor the phonologically unmarked elements of a paradigm; and optimal paradigms, if all things are equal (which they rarely are), always follow the numerical majority of elements in a paradigm. He pursues the various elements of his model and these predictions by looking at the templatic idiosyncrasies of Classical Arabic, where nouns and verbs are found to have differing syllable templates. McCarthy shows how these different templates can be perfectly explained by the workings of paradigm optimality, based on the (arbitrary) circumstances that verbs have CV suffixes, whereas nouns only have suffixes beginning with a vowel. This, therefore, is seen as a strong argument for doing away with templates entirely, as their existence can be fully explained by reference to independent factors.

Renate Raffelsiefen provides a contribution from an entirely different perspective in chapter 9. *Paradigm Uniformity vs. Boundary Effects* is set as a warning that paradigm uniformity should not be seen as a catch-all device for explaining unexpected phonological structures. Because of its nature, paradigm uniformity may be very difficult to distinguish from boundary effects – the fact that the meeting of differing phonological domains (usually phonological words) may be a perfectly acceptable explanation for unexpected behavior. Raffelsiefen provides criteria which help to distinguish one from the other, and in this way defends against accusations (which have
been reported in chapter 1) that PU always gets conveniently employed when no other suitable explanation is readily available.

*Uniformity and Contrast in the Hungarian Verbal Paradigm* by Péter Rebrus and Miklós Törkenczy (chapter 10) is a rather descriptive study that points in the same direction as chapter 7 (Kenstowicz): Paradigmatic effects do not only create irregular forms that are more similar to each other, sometimes they create irregular forms that ensure that paradigmatic contrast is not neutralized in certain environments. The study of the Hungarian data is particularly interesting, as it shows an intricate interplay of morphological and phonological constraints which create rather surprising results in the Hungarian verb paradigm. In one case paradigmatic contrast can only be maintained by using a morphologically irregular form that in fact neutralizes the paradigmatic contrast in a different morphological dimension. In the matter at hand, it appears that the maintenance of paradigmatic contrast in the person/number dimension seems to be higher ranked than the paradigmatic contrast in verbal definiteness (a category peculiar to Hungarian). In another case the contrast is maintained by allowing forms that violate the otherwise (in the verbal paradigm) strictly applied vowel harmony constraints of Hungarian. This chapter impressed me a lot as a fine example of linguistic craftsmanship. It is not only well written in a style that does not leave the reader behind, it also displays the willingness to engage even detailed problems that may endanger the validity of the proposed analysis. Section 10.5.6 is a very honest presentation of a problem that, as the authors admit, cannot currently be resolved by the proposed analysis. This not only testifies to the quality of the thinking leading up to that point in the analysis, it also sets the stage for further research that will bring the study of paradigmatic relationships further.

Another descriptive approach is chapter 11, *A Note on Paradigm Uniformity and Priority of the Root* by Suzanne Urbanczyk. The subject language here is Halkomelem, a Salish language spoken on the Canadian Pacific coast. Here the author uses data from verbal paradigms to prove the point that not necessarily the base takes priority in inflectional paradigms – a claim already stated by McCarthy in chapter 8. In Halkomelem it can be shown that in certain reduplicated stems the inflectional paradigm makes reference to the root of the verb.

**Observations**

The book appeared in the series *Oxford Studies in Theoretical Linguistics*, so it should not have been surprising that it takes the reader to the deep end of the pool of phonological thinking. Starting out with this book, within the first few pages I determined that I was in way over my head, as I had practically no knowledge of Optimality Theory; a firm knowledge of the basic terminology and workings of this model was, however, quite apparently expected from the reader. So I had no choice but to put the book aside and read up on the model first. Only then could I return and read this book profitably. I was struck by the similarity of thinking between the scholars pursuing OT and the nineteenth century Neogrammarians mentioned in the introduction to the book – the reader feels torn between admiration for the detailed, fine-tuned argumentation which appears to be confident to take on any phonological problem, and the somewhat repelling impression that you may twist a set of data sufficiently to succumb to your theory by applying seemingly arbitrary combinations of constraints and orders. In the end,
however, I definitely walked away with the firm impression that the application of a model such as OT may be really rewarding for those who want to find out what language really does.

Still, with every page that I struggled through, I was asking myself in which way a book like this can be seen as relevant to linguists whose main interest is to describe a language as accurately as possible. Naturally, to someone who is working towards providing a grammar as a product that supports language development, the question whether a weird set of data is better explained as a boundary effect or a paradigm-uniformity effect, and whether it should better be described following a base-priority or a symmetric approach, appears to be of little relevance. It is our job to describe these languages clearly and accurately, and that will be enough of a contribution for most of us. Then again it is fascinating to see to which strong predictions and statements a good theoretical linguist is able to come once s/he can access a good set of data provided by a descriptive linguist – the chapters written by Burzio or McCarthy may serve as examples for that. Even if I resign myself to the fact that I will never be contributing anything that comes close to the level of thinking displayed by every single chapter of this book, it serves as an encouragement to me that the data I provide may be put to good use by those who think deeper about languages. If I support the idea that the understanding of the intricacies of human language should progress, it may even motivate me to read a book like this once in a while to get a picture of what questions the theoretical linguists and typologists are asking and what kind of data may interest them.