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Review

Max W. Wheeler (2005). *The phonology of Catalan*. Oxford: Oxford University Press. Pp. xi + 387.

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Catalan phonology has received considerable attention in generative circles since the work of Wheeler (1975) and Mascaró (1976), most recently within the framework of Optimality Theory.* Our knowledge of the sound system of Catalan has also benefited from very careful phonetic research (see Recasens 1986, 1993, among others) and detailed dialectological investigation. In the book under review, Wheeler offers a synthesis of Catalan phonology in OT, building on his thorough knowledge of the Catalan facts and of the existing literature on the topic. This book is another major contribution by Wheeler to Catalan phonology.

The main variety of the language that is analysed in the book is Central Catalan, as spoken in and around Barcelona. Other varieties, however, especially Valencian and Majorcan, are also taken into account and receive detailed analyses in several chapters. On the other hand, the strikingly deviant Catalan dialect of Alghero, Sardinia, is excluded from the purview of the book (p. 6).

As in other OT work, the goal of much of the analysis in this book is to establish a hierarchy of constraints that accounts for the mapping between 'input' and 'output' forms. Input forms are given between phonemic slashes and output forms within phonetic brackets. Regarding the nature of these representations, Wheeler states that in his input representations 'the elements are something like classical phonemes' (p. 5). In fact, however, sometimes the representations within phonemic slashes are morphophonemic underlying forms; e.g. whereas *ric* 'rich' is represented as /ˈrik/, its homograph/homophone *ric* 'I laugh' is represented as /ˈri+g/ (p. 149). In this, Wheeler follows standard practice in contemporary work on Catalan phonology. In terms of classical phonemes (see Roca Pons 1971: 112–113), we would have /ˈrik/ in both cases (in a Prague school analysis /ˈriK/, with an archiphoneme unspecified for voice). As for output forms in phonetic brackets, these are normally the familiar idealised pronunciations that are usually found in generative work, where for each phoneme one or more contextually determined allophonic categories are represented, although there are exceptions (e.g. p. 15).

The book contains 11 chapters. Chapter 1 offers a brief and clear introduction both to the Catalan language and to the theoretical framework. Chapter 2 is

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entitled 'Phonological primitives and segment inventories' and addresses the main problems in determining the inventory of underlying contrasting segments. Following generative practice, Wheeler collapses phonemic contrasts with morphophonological alternations. The results are not always satisfactory, which, to his credit, Wheeler admits. Consider the alveolo-palatal segments. In intervocalic position, voiced and voiceless alveolo-palatal fricatives and affricates are found in phonemic contrast.

(1) *Intervocalic contrasts*

/ʃ/	baixar	/bəˈʃa/	'to lower'
/ʒ/	roja	/ˈrɔʒə/	'red (FEM)'
/ʧ/	despatxos	/dəsˈpaʧus/	'offices'
/ʤ/	desitjar	/dəziˈʤa/	'to desire'

In other contexts, however, some of these contrasts are neutralised. In particular, word-finally the contrast is only between the voiceless fricative and voiceless affricate since Catalan does not have a voicing contrast in this position:

(2) *Word-final contrasts*

/ʃ/	baix	/ˈbaʃ/	'low'
/ʧ/	roig	/ˈrɔʧ/	'red (MASC)'
	despatx	/dəsˈpaʧ/	'office'
	desig	/dəˈziʧ/	'desire (N)'

As can be gathered from the examples, at the morphophonemic level, on the other hand, we find that final /-ʧ/ alternates with all of intervocalic /-ʧ-/, /-ʒ-/ and /-ʤ-/ in different sets of words. After discussing several options for input representations that would account for these morphophonemic alternations (he does not consider an analysis in terms of classical phonemes), Wheeler finally gives up in his quest for a clear analytical solution and concludes: 'But who but a linguist is forced to make such a choice? There is little evidence that speakers are forced to do so' (p. 21). The discussion is complicated by additional analytical decisions. On the one hand, Wheeler includes schwa-final forms like *viatge* /biˈaʤə/ 'journey' among those ending with a word-final palato-alveolar consonant, since he takes their final vowel to be 'epenthetic' (thus, *viatge*/*viatjar* 'journey'/'to travel', providing a contrasting pair with *desig*/*desitjar* 'desire'/'to desire'). In addition, the output forms in phonetic brackets that Wheeler assumes in this section do not correspond to pronunciation, and are provided with either a voiced or a voiceless final consonant depending on morphophonological considerations, 'ignoring word-final devoicing' (p. 15). That is, even the output forms are morphophonemic in this section. Whereas Wheeler's presentation of the data is consistent with the generative theoretical framework that he adopts, I agree with his own assessment that underlying representation theory forces the analyst to make unmotivated choices regarding the facts at hand. I believe that an exposition in terms of classical phonemes and positional neutralisations (or, alternatively, phonemes and archiphonemes) could be a more effective way to present the facts of Catalan, treating morphophonemic

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alternations separately. Nevertheless, the fact that a different, generative, perspective is adopted is a theoretical choice and cannot be considered a weakness of this book.

Over half of the chapter is devoted to an examination of restrictions on the distribution of vowels. This is one of the main aspects of geographical variation in Catalan, as different dialects have undergone different processes of vowel reduction and neutralisation. In Central Catalan, there are seven vowel phonemes in stressed position, /i e ɛ a ɔ o u/, but only three in unstressed syllables, /i ə u/, except that the vowels /e o/ can also be found in a very limited set of unstressed environments. Regarding morphophonological alternations, the three stressed non-round vowels /e ɛ a/ alternate with unstressed /ə/, whereas the three round vowels are generally reduced to /u/ in unstressed syllables. This chapter offers probably the most detailed description of vowel distribution in Catalan available anywhere. Underlying or input representations of vowels are sometimes based on other dialects (p. 70), when there are no relevant morphophonological alternations, and, occasionally, Wheeler also makes use of what look like Praguean archiphonemes (or underspecified underlying segments), /A E O/ (p. 71).

One of the most surprising phenomena of vowel distribution in Central Catalan, the fact that exceptionally /e/ and /o/ may occur in posttonic syllables but never in pretonic ones (e.g. /ˈboston/ 'Boston' with exceptional unstressed /o/ *vs.* /bustuˈnja/ 'Bostonian) is ultimately left 'open to further investigation' (p. 72), but the facts are described in exemplary detail.

Given the detail with which many other facts of vowel distribution are treated, I missed a treatment of vowel harmony in Valencian varieties, a phenomenon of considerable typological importance, which is not discussed in this book (although on page 53 the reader is referred to Jiménez 1998 for an OT treatment).

Chapter 3 is concerned with syllable structure. The bulk of the chapter is devoted to the syllabification of sequences of vocoids, specifically to stating the constraint hierarchy that accounts for the near-complementary distribution of high vowels and glides. The facts are quite complex, as they depend on the specific sequence of vocoids, word size, position of the sequence with respect to both the beginning of the word and the stressed syllable and other phonological and morphological considerations. Both for the facts and for their OT analysis, Wheeler relies in part on previous work, especially Cabré & Prieto (2004), but the analysis has many original aspects.

Chapter 4 deals with the resolution of vowel sequences across word boundaries. The main source of data is Recasens (1993). Wheeler systematically describes the results of the different types of sequence, taking vowel height and stress into account. Essentially, a schwa is deleted in some sequences, and an unstressed high vowel may glide in contact with another vowel. Sequences of identical high vowels may be reduced to the duration of a single vowel, depending on the context. The analysis includes 16 different constraints (including constraints of the same 'family') and 24 rankings between pairs of these constraints (p. 144). Although the analysis produces the correct results, one has to wonder whether there is not a simpler way to account for the facts. A different question is the extent to which the phenomena described in this chapter are categorical.

A well-known fact of Catalan is that it neutralises all contrasts in voice in coda consonants. This is the topic of Chapter 5. Word-final oral stops, which are

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always voiceless before pause, assimilate in voice to a following word-initial consonant, but are voiceless before word-initial vowel. On the other hand, word-final fricative and affricate 'sibilants', which are also always voiceless before pause, assimilate in voice both to following word-initial consonants and to vowels. That is, word-final stops and sibilants differ in their realisation before a vowel, cf. *po*[t] *ajudar* 's/he may help' *vs*. *po*[ʤ] *ajudar* 'you may help'. To capture the fact that word-final oral stops are voiceless before a vowel, Wheeler proposes the constraint IDENTWd-Phr[±voice], which states that 'the value for [±voice] in a prosodic word is the same as its correspondent in a phrase' (p. 161). By prosodic word, Wheeler means the word pronounced in isolation, and not the underlying input form, since in its underlying form a word like *pot* 's/he may' ends in /d/ for Wheeler, because of morphophonological alternations. The voicing of sibilants in the same prevocalic context is obtained by a higher-ranking constraint, LAZYSIBILANTS: 'word-final sibilants are voiced before a vowel' (p. 163). Finally, both word-final plosives and sibilants assimilate to a following consonant because in this context they are in a coda and an AGREE constraint states that 'a coda obstruent and a following segment must agree in voicing' (p. 161). This analysis in terms of constraints does not seem to differ substantially from a rule-based analysis with three rules. Much of the appeal of OT lies in its constraints being universal. Analyses where the constraints are formulated in a way that does not go beyond describing the facts of a particular language offer less support for the theoretical model. (This is a general point, not a specific criticism of Wheeler's analysis.) That the universal character of constraints is not a primary consideration in this chapter is also apparent from the analysis that is proposed to account for the facts of the Alacantí dialect. In this variety, word-final oral stops are realised as voiced before a vowel (that is, all word-final obstruents show the same voicing pattern): *po*[ð] *ajudar* 's/he may help'. To account for this fact of dialectal variation Wheeler proposes a LAZY constraint parameterised for Alacantí, $\text{LAZYVOICE}_{alacantí}$: 'word-final obstruents are voiced before a vowel' (p. 164). It seems to me that an alternative OT analysis where these facts of dialectal variation would result from different re-rankings of a common set of constraints should be more highly valued.

An interesting fact of Majorcan Catalan is that it has word-final clusters of the *muta-cum-liquida* type, although only in verb forms. Wheeler points out that when these clusters are preceded by a nasal, there is a contrast between voiced and voiceless stops, as in *empr* 'I use' *vs*. *sembr* 'I sow' (p. 150). Wheeler offers some insights as to why voicing may be easier to maintain in this context. In this book Wheeler does not consider the possibility of an empty nucleus following the consonant cluster, although an account along these lines was sketched in Dols & Wheeler (1996).

Chapter 6 is concerned with patterns of place and manner neutralisation and assimilation of consonants across word boundaries. The data are mostly from Recasens (1993) and other work by this author, and the analysis builds on de Lacy's (2002) proposal. Majorcan Catalan, which shows much more radical patterns of cluster reduction than other dialects, as in *poc nou* ['pɔnˈnɔw] 'not much new' (in spite of the fact that it allows the clusters mentioned in the above paragraph), is treated in a separate section (with data mostly from Dols 1993).

Chapter 7 studies word-final clusters and their simplification. This is another aspect where interesting dialectal variation is found. In this chapter four

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geographic and stylistic variants are described and analysed together: 'Catalonia more formal', 'Catalonia less formal', 'Valencia' and 'Majorca'. For instance, the final *t* of *alt* 'high (MASC)' is pronounced in Valencia and Majorca, but not in Catalonia (Central Catalan), which does not allow this final cluster. In the plural *alts* 'high (MASC PL)', the orthographic *t* is not pronounced in any dialect. On the other hand, in *part* 'part', the *t* is only omitted in informal speech in Catalonia, and consistently preserved in the other two geographical dialects, but in its plural *parts*, the *t* is systematically deleted both in Catalonia and Majorca and pronounced only in Valencia. This is the sort of variation that OT is particularly well equipped to handle through different rankings of a set of constraints, and the chapter does provide a satisfactory account, at least regarding geographical variation (whether stylistic variation is adequately modelled as switches between a 'formal' and an 'informal' grammar is less obvious).

Chapter 8 is entitled 'epenthesis and other sonority-related phenomena'. In a number of cases, Wheeler writes 'epenthesis' in quotes since, given the Richness of the Base assumption of OT, sonority sequencing constraints would ensure that a vowel would be present in the output whether the input is taken to have a vowel or not. This applies, word-initially, to words like *estrat* 'stratum', since, as in Spanish, initial sC clusters are not allowed, and, word-finally, to words like *apte* 'apt'.

Morphophonological considerations lead Wheeler to claim that the *d* of *voldrem* 'we will want' is epenthetic (as it surely is from a diachronic point of view). Regarding the nature of the epenthetic consonant, a comparative perspective would have been useful, since diachronically the same phenomenon is found in English *empty, thimble*, French *tendre, nombre*, etc., and similar examples in Spanish and other languages, where the place of the epenthesised consonant is regularly determined by the preceding consonant and voicing by the following one (see e.g. Hock 1991: 117–119).

To explain the lack of final epenthesis in Majorcan verbal forms like *filtr* 'I filter', but not in nouns (*filtre* 'filter'), Wheeler follows Lloret (2004), who proposes an explanation in terms of paradigm effects which relies on the fact that the root is followed by another vowel in most of the 45 forms of the verbal paradigm. Dialectal differences in this respect appear to be more problematic for a unified analysis than those in the previous chapter. In fact, the chapter ends with these words: 'These differences remind us that there are many, and unpredictable, ways of resolving conflicts between paradigm constraints and syllable structure constraints' (p. 275).

Chapter 9 describes and analyses word-stress patterns, with a shorter section on phrase-level rhythmic patterns. Wheeler defends the point of view that word stress in Catalan in based on iambic feet and offers an entirely original analysis of the facts. Regarding function words and compounds, Wheeler takes the presence of vowels other than /i ə u/ in Central Catalan as evidence of stress on that syllable. In this, his view appears to differ from that of other authors, who do not see a necessary connection between these two phenomena. For instance, whereas Wheeler states that a compound like *tr̲encacl̲osques* 'puzzle' (where the two underlined vowels are unreduced /ɛ/ and /ɔ/) does not differ in rhythmic structure from the verb phrase *trenca closques* 'breaks skulls' (p. 279), Mascaró (2002: 93) claims that in these compounds the first member loses its stress (even if the vowel is kept unreduced), so that there is a rhythmic contrast between compounds and segmentally identical phrases. Prieto (2003) gives evidence that

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compounds of this type are normally pronounced with a single pitch accent. That is, for these other authors, there would be a contrast between *trenca-closques* /tɾɛŋkəˈklɔskəs/ 'puzzle', with one stress, and *trenca closques* /ˈtɾɛŋkə klɔskəs/ 'breaks skulls', with two word-level stresses, as in comparable examples in Spanish. An excellent aspect of this chapter is that it offers examples of all possible combinations of heavy and light syllables and stress patterns.

Chapter 10 deals with two separate phenomena. The first part of the chapter is devoted to the allophony of voiced oral stops, which have continuant allophones in many contexts. This section contains a very useful comparison of the frequency of occurrence of continuant and non-continuant allophones in postconsonantal contexts in different Catalan varieties, based on phonetic transcriptions provided in the texts collected for the Catalan Dialect Atlas. An interesting fact that Wheeler notices is that those dialects, such as Majorcan, that have /v/ contrasting with /b/ show a much greater frequency of non-continuant [b] in lenition contexts. This is an important insight (see also Ortega-Llebaria 2004).

The second part of the chapter is devoted to three cases of 'phonologically conditioned allomorphy'. The first two cases have to do with the absence of a word-final consonant where the consonant (an alveolar nasal or a rhotic) appears in other forms of the inflectional paradigm (and in derivation) as in *català* 'Catalan (MASC SG)' *vs*. its feminine *catalana* and its plural *catalans*. Wheeler offers a systematic description and exemplification of these morphological alternations and their phonological environments (which are somewhat different for the nasal and for the rhotic). Since both of these phenomena have a number of exceptions, Wheeler sensibly proposes to treat these alternations as involving a selection between two allomorphs. For word-stems presenting this allomorphy, which allomorph is selected in a specific morphological context is determined by constraint ranking.

One of the most complicated aspects of Catalan morphophonology involves the pronunciation of object clitic pronouns and their sequencing. This is the topic of the last chapter of the book. The chapter deals mostly with Barcelona Catalan, whose facts are systematically presented, although some Valencian forms are also discussed. Most of these clitics can have three, four or even five different pronunciations, depending on whether they occur as proclitics or as enclitics and depending on the adjacent segments. Wheeler argues that the underlying form of what he calls C clitics and CC(i) clitics consists only of consonants and that a preceding or following schwa is epenthetic. For instance, for the clitic glossed 'some' which surfaces as single C in *n'imita* 's/he imitates some', as VC *en tira* 's/he throws some' and as CV in *tirem-ne* 'let's throw some', the underlying form /n/ is proposed. The analysis is convincing, but, given the assumption of Richness of the Base invoked elsewhere in the book, I wonder why a single underlying form needs to be chosen, instead of formulating the constraints in such a way that the appropriate surface form would be selected in every case regardless of choice of input. The analysis in this chapter is based in part on Bonet & Lloret (2001, 2002).

In conclusion, this book offers a wealth of information on Catalan phonology and morphophonology, with numerous pointers to recent literature. As a theoretical contribution, it provides a test of the strengths and weaknesses of the theoretical models it adopts when the task is to provide a comprehensive account of the facts of a language, including dialectal variation. The OT

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framework allows Wheeler to offer an elegant and appealing account of facts of variation like those reported in Chapter 7. As for the theory of levels of representation, for the most part, Wheeler adopts the two levels of representation of generative phonology. The collapsing of the phonemic and morphophonemic levels in this theory sometimes results in elegant analyses, as in Halle's (1959) celebrated Russian voicing assimilation example, but other times the results are quite the opposite. Wheeler's discussion of Catalan alveolo-palatals is an example of this second type of situation, as Wheeler himself notices. Wheeler's appeal to a correspondence between words in isolation and words in phrases in his treatment of word-final consonant assimilation can also be taken as an argument for the phonemic level, even if Wheeler's formulation is somewhat different.

The book is beautifully produced, with very few typos, in spite of the abundance of phonetic symbols and tableaux (which tend to create many problems at the typesetting stage). This is evidence of very careful proofreading. Perhaps an appendix with a complete list of constraints with their definitions would have been useful (this could go on a webpage), although several chapters do include summaries where the constraints proposed in the chapter are ranked.

The suggestions for alternative analyses that are offered at different points in this review are not to be construed as criticism of this book. Rather, it is a virtue of this book that it is bound to inspire readers coming from different theoretical perspectives to explore other possibilities of analysis. This is because of Wheeler's clear and systematic description of the facts and the explicitness of his analyses. I enthusiastically recommend this excellent book to anyone interested in knowing about Catalan phonology.

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