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Phonetics and Phonology: Interactions and Interrelations

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This volume consists of 13 papers presented at the 2007 conference 'Phonetics and Phonology in Iberia'. As indicated by its editors, it comprises 'contributions dealing with phonetic correlates of phonological categories and contributions focusing on the interplay of different aspects of sound patterning in language', by researchers from a variety of backgrounds (p. 2). In their introduction, the editors stress the significance of previous work in the 'laboratory phonology' paradigm, and express the hope that the present volume will 'contribute towards spreading further interest in [the] enticing field of inquiry between phonetics and phonology' (p. 5). The volume is divided into three sections: Between Phonetics and Phonology, Segmental and Prosodic Interactions, and Interactions between Segments and Features. Several cross-cutting themes and methodologies are evident, and for the purpose of this review I will group the papers on broad methodological grounds in the first instance.

First, seven papers present results of experimental studies focusing on the production or perception of particular segment sequences or prosodic categories. These fit clearly in the 'laboratory phonology' mould, and are likely to be of direct interest to a phonetic readership. I discuss them here along thematic lines. Focusing on the production of particular segment sequences, Riera et al. compare the spectral and durational properties of the 'schwa-like element' often perceived before American English postvocalic /r/ (as in *fear*) with those of 'canonical' schwa (as in *ahead*). Their results suggest that the quality of the former is more variable and context-dependent than that of canonical schwa, and that its duration is more heavily influenced by the local speech rate. Schmeiser aims to establish what factors influence the duration of a similar

'intrusive' vowel found between /r/ and a following consonant in Spanish, and whether patterns are uniform across six world varieties of the language. He finds significant effects of the place of articulation of the following consonant, and of the presence versus absence of a word boundary between the two segments, amid a considerable amount of variation across the varieties of Spanish considered.

Focusing on the production of prosodic categories, Prieto and Ortega-Llebaria present elicited data from Spanish and Catalan on the relation between pitch contour complexity and syllable duration. They show among other things that complex contours such as rise-fall induce syllable lengthening in comparison with simple contours such as rise and fall. Manolescu et al. investigate pitch and durational correlates of broad versus narrow focus in Romanian. Among their findings is that narrow focus is associated with relative lengthening of the focused word, achieved not by expanding the duration of its vowels, but rather by compressing those of surrounding words. White et al. compare the Italian of speakers from the Veneto, which has been described as 'syllable-timed' in the literature, and that of speakers from Sicily, which has been described as having features of 'stress-timing'. Using controlled data, they find no robust differences in scores for several widely used rhythm metrics. They do find significant differences in speech rate, and in the temporal marking of nuclear utterance-final stressed vowels. They also report differences in vowel reduction patterns between the two varieties, and suggest that the perception of rhythmic variation may be determined by a combination of – at least – temporal and segmental factors. Finally, Chen aims to establish whether sentence-initial topic and focus in Dutch, which are both marked by the intonation contour H*L, show consistent prosodic differences in implementation by adult and child speakers. She reports robust differences in F0 range, duration and F0 alignment in the speech of adults, and finds that while children of 7–8 are more adult-like in their production than children of 4–5, who show no differentiation between topic and focus, they have not yet mastered the full adult system.

These production studies, all of which highlight the multiplicity of phonetic correlates of

categories such as stress and focus, are complemented well by the perception study of Ortega-Llebaria and Prieto, who conduct an experiment to investigate the interaction between multiple cues to stress in unaccented syllables in Castilian Spanish. Among their results is that listeners depend relatively heavily on duration cues for syllables with /a/, which typically displays salient stress-related lengthening, but on intensity cues for syllables with /i/, which is less susceptible to lengthening – in other words, listeners' perception strategies are informed by their knowledge of typical production patterns.

Second, four papers present more traditional phonological accounts of sound patterns, based mostly on transcriptions obtained through fieldwork or literature searches. In order of appearance, Cabré and Ohannesian develop an Optimality Theory account of the stress and syllabification patterns associated with high vowels in Spanish nouns and related verb forms. Battisti and Hermans propose a feature-geometrical and metrical account of variable palatalisation of dental stops in a variety of Brazilian Portuguese, couched again in Optimality Theory. Canalis considers the representation of vowel harmony patterns in dialects of Central Italy, drawing on the notions of underspecification and variable node activation, among other things. Finally, Cabré accounts for vowel reduction and harmony patterns in Catalan loanword phonology using Optimality Theory constraints and a stratified lexicon.

Third, two papers fit in neither of these categories. Both present extensive literature reviews and selected data to support a theoretical argument. Arbisí and Beckman argue for a close relationship between first-language consonant development and the acquisition of metrical structure, and present supporting evidence from ongoing research in the form of distinct consonant disfluency patterns among children learning metrically different languages. Solé reviews the evidence for a phonetic basis of the common co-occurrence of the features [+voice] and [+nasal] in segment inventories and sound patterns. She argues that acoustic-auditory factors make glottal vibration facilitate the perception of nasalisation, while articulatory-aerodynamic factors make nasality facilitate glottal vibration. Given the latter, she suggests that 'nasal leakage' may be used as a controlled adjustment to ensure voicing.

Together, these papers make a good contribution to the literature in experimental phonetics and laboratory phonology, and they will be of interest to practitioners in these areas.

Unsurprisingly given the provenance of the volume, phoneticians, phonologists and dialectologists with a particular interest in Romance languages will find a wealth of new empirical and experimental data from the field. Still, the volume is also of wider interest. A considerable range of languages and sound patterns is covered, and at several points received theoretical or methodological wisdom is challenged. For example, Prieto and Ortega-Llebaria find that in implementing the complex pitch contours under consideration, some speakers partially truncate the contour, while others compress it. This goes against the widely held idea that truncation and compression are language- and variety-specific strategies – rather, they appear to be *speaker-specific*. Similarly, White et al. show that several widely used rhythm metrics are incapable of capturing salient rhythmic differences.

On a critical note, readers with a background in experimental phonetics may find some of the contributions rather vague on important methodological points. For example, Riera et al. and Schmeiser do not discuss in any detail their procedure for segmenting the vowels they investigate; Riera et al. refer instead to a previous study. Manolescu et al. are similarly unclear on how they measured pitch alignment, and appear not to have manually checked pitch tracks before extracting values. The volume also contains some analytical weaknesses that more stringent editing might have prevented. For example, Schmeiser posits seven hypotheses regarding the duration of 'intrusive' schwa in Spanish. Three of these relate to the place of articulation of the following consonant, and we see several measurement values appearing in multiple data tables. In fact, two of the hypotheses partly contradict each other: heterorganic /rC/ clusters are hypothesised to accommodate longer intrusive vowels than homorganic clusters such as /rt/, while clusters with labial consonants are hypothesised to accommodate *shorter* intrusive vowels than clusters with coronals. Not surprisingly, only one of the three hypotheses finds robust support in the data.

Moreover, the use of statistics is not always as effective as it could be. Several papers report the results of ANOVAs without incorporating 'speaker' or 'variety' as random variables in their analyses. Chen prefers mixed-effects modelling to ANOVA and explicitly includes 'participant' among the random-effects factors — but only reports p values for her fixed-effects factors. This means that speaker- and variety-specific patterns

are either not discussed in full, or discussed with reference to descriptive statistics only. More comprehensive statistical modelling would have strengthened the analysis in these cases. More seriously, Schmeiser reports complex-variable effects as ‘significant’ without reporting associated pairwise comparisons — thus overestimating the significance of some effects, while underestimating that of others. This weakens what is otherwise an interesting and ambitious investigation.

Finally, given the title and theme of the volume one might expect some more in-depth discussion of interface issues than this volume contains. For example, Riera et al. appear to take for granted that the observation of gradience in a sound pattern means it is best accounted for in terms of phonetic implementation, not phonological representation. This line of argument has been contentious since the emergence of exemplar theory, in which phonological representations accommodate a great deal of gradience along phonetic parameters, and deserves critical attention. Solé argues that since the frequent co-occurrence of [+nasal] and [+voice] can be

understood in phonetic terms, there is no need to encode it in phonological constraints, as several proponents of Optimality Theory have done. However, she also suggests that current models of feature geometry should be altered if they are to reflect the close physical relationship between voice and nasalisation, and that sound patterns resulting from the interplay between physical and formal constraints ‘will certainly be encoded in the grammars of particular languages’ (p. 230). While these suggestions are not necessarily contradictory, they warrant more elaborate discussion than the paper contains. Of course, they confirm the editors’ assertion that ‘general questions like the relevance of phonetic detail to grammar, the interplay of gradual and/or categorical processes [. . .], or the extent of the dependency between the phonetics of features and processes and their form and function in language are yet to be fully understood’ (p. 2). The main contribution of this volume is arguably the expansion of the body of empirical data that bear on these questions — answering them is another matter.

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