Editors' introduction

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The substance of all languages, whether spoken or signed, consists of the gestures of the articulators which generate a signal – whether these are made by the hands, lips, tongue or larynx. These gestures create aural and visual images embodying the utterances that a speaker/signer intends to produce and create an interpretable percept in the audience. At the same time, all of the strictly linguistic signals are accompanied by additional facial, manual and bodily gestures that contribute to the communicative act. The aim of the Twelfth Conference on Laboratory Phonology, held at the University of New Mexico in July 2010, was to consider all of the ways that viewing human language as built of and accompanied by gestures shed light on each other.

This is the first of two special issues of *Laboratory Phonology* in which written versions of papers originally presented orally at the conference will appear. The papers in this issue approach the gestural nature of language by analyzing speech and signed language as coordinated gestures, and by examining the contribution of gestures of the face and hands to the interpretation of the prosody of spoken utterances.

One theme that re-occurs throughout this set of papers is the importance of time and timing in phonological structure. Although strictly categorical phonological representations excluded gradient measures of timing, several papers in this issue apply the model of Articulatory Phonology which exploits gradient timing to explain phonological patterns; other papers are not explicitly couched in terms of this model, but still view timing as a critical component of phonological structure.

The relative timing of gestures is significant in revealing phonological structure. The paper by Pouplier and Beňuš shows that consonants serving as syllable nuclei in Slovak are distinguished by differences in the relative timing of gestures, when compared to syllables with canonical vocalic nuclei, more than by the inherent temporal properties of the individual gestures. In Tashlhiyt Berber, the prototypical example of a language that allows consonants to serve as syllable nuclei, Ridouane and Fougeron show that changes in the relative timing of consonantal gestures are responsible for the appearance of schwas in the acoustic signal.

By a happy coincidence for a conference held in a state that prides itself on its Hispanic heritage, four of the papers in this collection look at the production of

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gestures for Spanish consonants. These exhibit complex patterns of variation across dialects and contexts. The papers differ as to whether they see variation explained by inherent dynamical properties of the gestures involved in consonantal production, by the coordination among these gestures, or by changes in phonological categorization, as proposed by Hualde et al. In examining the production of labial consonants in particular, Parrell shows that the stop-approximant alternation of the voiced series of Spanish stops is a lawful consequence of variation in gestural duration rather than an arbitrary alternation in constriction degree. Rather than duration, changes in gestural magnitude are seen by Proctor as accounting for the vocalization of liquids in Spanish. In contrast, differences between Argentine and Cuban Spanish in the details of nasal assimilation cannot be explained by the dynamic properties of the gestures involved, or their relative timing, according to Kochetov and Colantoni. This assimilation is largely categorical and must, they claim, be part of speakers' phonological grammar. Kochetov and Colantoni go on to suggest that this process does support some general principles of gestural organization, especially the linkage of place and stricture as joint characteristics of a single, unified gesture rather than as independent tiers in an autosegmental representation.

Reduction processes are examined in several of the papers. Even when the processes are consistent with predictions on the basis of physiology, careful analyses show that they are also language-specific. Part of the phonology of an individual language is how it implements these general patterns. For American Sign Language (ASL), undershoot of the gestures involved in sign production is part of the language's phonology, not simply laziness on the part of the signer. Russell et al. argue that while one constraint on undershoot is fairly clearly physiological (signs are not articulated in such a way as to risk the finger contacting the eye), the distribution of acceptable productions must be part of signers' phonological knowledge. In comparing two spoken languages, French and Spanish, Torreira and Ernestus show that while the patterns of reduction show some broad similarities, they are clearly distinct: French vowels are influenced more by neighboring stops than Spanish vowels, but Spanish voiceless stops assimilate more to neighboring vowels than do French stops. In other words, coarticulation is active in both languages, but the gestures involved in producing different sounds exhibit different targets and different degrees of susceptibility to coarticulatory influences. Along similar lines, Proctor found that coarticulatory resistance differs between the dorsal and coronal gestures that make up the liquids he studied in Spanish and Russian. The gestural analysis he proposes account for lenition processes as well as metathesis.

Lenition processes in Spanish were also studied by Hualde et al., who show how similar processes at different stages of completion support a model of sound change in which different factors condition sound change at different stages of its development. As with the undershoot studied by Russell et al., what might appear to be an 'automatic' reduction of gestural magnitude in these lenition processes are in fact part of the structure of the language. This is also consistent with Parrell's proposal

for the role of gestural duration in explaining the stop/approximant alternation: Spanish grammar, in common with many other languages, stipulates a shorter duration for voiced stops than for voiceless ones, and this has consequences which include an apparent enhancement of differences in constriction degree.

Two papers in this volume examine gestures that accompany speech, rather than those that go into producing speech sounds themselves. Both focus on the interpretation of visual prosody, specifically the perception of facial gestures. Children's development of the capacity to express prosody visually is the topic of Swerts's study. He sees this development as part of their acquisition of the socially communicative use of language. Learning to use facial gestures in a culturally appropriate and meaningful way is a crucial part of learning to speak. Facial gestures also serve a crucial communicative role in distinguishing utterance types, according to Borras-Comès and Prieto. Their study showed that visual information alone could suffice for Catalan speakers to distinguish between contrastive focus and echo questions. These innovative studies show that spoken communication is a multimodal activity, including the gestures of the face (outside the vocal tract) as surely as signed language communication integrates non-manual gestures.

One of the hoped-for consequences of the LabPhon 12 conference was to incite greater appreciation for the complexity of linguistic gestural structure in all its modalities. We feel that the papers collected in this volume go a long way toward realizing this goal.

Finally, we take this opportunity to thank again those who provided financial support for the conference. A grant (BCS-0951240) from the National Science Foundation gave crucial funding for the conference itself and for preparation of the journal issues. The University of New Mexico contributed through the Regents' Speaker Endowment, the Faculty Development Fund of the College of Arts and Sciences, and the Department of Linguistics. We also received funding from the late Robert W. Bybee, with matching funds from the ExxonMobil Corporation, and from Northern Digital, Inc. We are grateful to all the volunteers who assisted with the conference, to those who reviewed papers for the conference and for publication in this journal, and we thank Deborah Wager for her assistance with the editorial process.

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