

Mutually assured autonomy

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Phonetics and phonology must interact, but how? In this talk, I will argue that phonetic and phonological universals are different in kind, and that this difference guarantees sufficient autonomy for these two components of the grammar that neither kind of universal can be reduced to the other.

Phonetic universals. Ohala (1981) describes a class of sound changes which result from listeners' failing to detect a segment which dramatically perturbs the acoustics of a neighboring segment. This failure can lead the listeners to interpret that perturbation as a property of the affected segment and to reproduce it without also producing the segment that caused the perturbation. One example, among many, of such sound changes is earlier Loloish *-ap, *-at, and *-ak rimes becoming in -o, -e, and -æ rimes, respectively, in Lisu (Thurgood and Javkin, 1975). The unreleased pronunciations of the stops made them hard to detect, while leaving undiminished the perturbations of F2 and F3 in the preceding [a] induced by their places of articulation. The distinct vowel qualities in present-day Lisu arose when listeners misinterpreted these perturbations as intended by the speaker. This class of sound changes illustrates two pervasive and complementary perceptual processes. The first differentiates a segment, e.g. the original *a, from its neighbors, the following *p, *t, *k, and is only possible when the listener detects the neighbors' presence. (Either compensation for coarticulation or auditory contrast with the neighboring segment produces differentiation.) Had the neighboring stops been reliably detected, *a would very likely have remained unchanged, as listeners would be able to differentiate it from the following stops. The second process integrates the acoustic material within a segment, and occurs when the following stop goes undetected. (Integration also exaggerates the differences between what were allophones and promotes the successful transfer of contrast from the neighboring sound to those allophonic variants.) I present the results of a series of experimental studies of these processes, which also show that they operate independently from listeners' application of their linguistic knowledge. This independence suggests that they are general perceptual processes rather than specifically linguistic ones, even if their action influences linguistic processing. Because these processes also promote the segmentation of the stream of speech, the perceptual coherence of the resulting segments and their constituent features, and potential contrasts between former allophones, they are among the universal capacities that make phonologies possible and give them the properties they have. Individual phonologies will, of course, differ from one another in how they reflect the effects of these general processes, but those differences do not make the processes themselves language-specific.

Phonological universals. de Lacy and Kingston (2009) argue that universal grammar prohibits neutralization to dorsal place or epenthesis of dorsal segments. Although they reanalyze appar-

ent counterexamples, two other arguments are more important for this talk. First, this prohibition is not a side effect of coronals never changing into dorsals; indeed, this sound change is frequent, e.g. Proto-Eastern Polynesian *taŋata “man, people” has become [kanaka] in Hawai’ian. This fact suggests that synchronic grammars in which place contrasts neutralize to dorsals or in which dorsals were epenthetic should be learnable. Their absence is therefore telling. Nor can it be a consequence of [k] being a poorer output of neutralization or epenthesis than [t]. [k] resembles [ʔ] phonetically much more than [t] does: [k] coarticulates with adjacent vowels rather than causing them to coarticulate with it, as [t] does. Neutralization to [k] would thus be most like debuccalization, the process that neutralizes place distinctions to [ʔ], and epenthesis of [k] would similarly change the input nearly as little epenthesis of [ʔ], while neutralization to [t] or epenthesis of [t] would change the signal dramatically. This apparently arbitrary prohibition has an explanation, namely, that a dorsal output is harmonically bounded by coronal and glottal outputs, i.e. the explanation comes from a constraint on possible synchronic grammars, and not the mechanisms of possible sound changes nor from the phonetic characteristics of these sounds. The grammatical origin of universal phonological constraints does not, of course, prevent them from being psychologically active (see Dupoux, Kakehi, Hirose, Pallier, and Mehler, 1999; Moreton, 2002, among many others).

The first example suggests that phonetic universals are about how speakers and listeners behave and how their behaviors subserve quite general properties of phonologies. The second example suggests that phonological universals are instead quite specific characteristics of what sounds and patterns a synchronic grammar can or cannot produce. The two examples also suggest that each kind of universal is free of influence from the other: linguistic knowledge does not affect the workings of the universal phonetic processes, nor are phonological universals reducible to sound change or the phonetic substance of the sounds to which they refer. If these characterizations are correct, then phoneticians and phonologists should find security in a perpetual cold war between phonetic and phonological universals rather than each seeking to bankrupt the other and claim a precarious hegemony.

References

- de Lacy, Paul, and John Kingston. 2009. Synchronic explanation.
- Dupoux, Emmanuel, Kazuhiko Kakehi, Yuki Hirose, Christophe Pallier, and Jacques Mehler. 1999. Epenthetic vowels in Japanese: A perceptual illusion? *Journal of Experimental Psychology: Human Perception and Performance* 25.1568–1578.
- Moreton, Elliott. 2002. Structural constraints in the perception of English stop-sonorant clusters. *Cognition* 84.55–71.
- Ohala, John J. 1981. The listener as a source of sound change. *Proceedings of Chicago Linguistic Society: Papers from the parasession on language and behavior*, 178–203. Chicago: Chicago Linguistic Society.
- Thurgood, Graham, and Hector R. Javkin. 1975. An acoustic explanation of a sound change: *-ap to -o, *-at to -e, and *-ak to -æ. *Journal of Phonetics* 3.161–165.