An Emergent Approach to the Guttural Natural Class
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The post-velar consonants (uvulars, pharyngeals/epiglottals, and glottals) have been claimed to form the guttural natural class. Hayward and Hayward (1989; hereafter H & H) and McCarthy (1994) argue on the basis of evidence from the Semitic and Cushitic stocks that a guttural natural class must be formally recognized in phonological theory. H & H propose a 'zone of constriction' feature [GUTTURAL]. McCarthy (1994) renames this feature [PHARYNGEAL], refines its 'zone of constriction' basis in terms of orosensory perception, and integrates it into standard feature geometry by placing it under the PLACE node on par with ORAL place and its termini ([LAB], [COR], [DORS]). The claim is that the guttural natural class is an innate part of Universal Grammar. This study argues that while there is clear and persuasive evidence for the guttural natural class, it should be viewed as emergent and language-specific rather than innate and universal.

H & H (1989:179-183) and McCarthy (1994:207-213) show that all the post-velar consonants lower or back vowels in phonological processes in Arabic, Hebrew, several Ethiopic languages, and D'opaasunte (Cushitic), and this is taken as strong cross-linguistic evidence for the guttural natural class. Supposing an innate and universal guttural natural class, uvular, pharyngeal, and glottal consonants are predicted to lower or back vowels regardless of whether another guttural consonant occurs in a given language. Of the 628 language varieties (549 Ethnologue languages) in P-base (Mielke 2008), 13 varieties possess at least one uvular, but no glottals or pharyngeals. In 3 of these, high vowels are actively lowered, and in 2 others, uvulars cannot occur with front vowels. 393 varieties possess at least one glottal and no uvular or pharyngeal, and in only one of these are glottals reported to affect vowels as expected. That one language is Amharic (Ethiopic Semitic) in which "three earlier guttural spirants" merged as modern /h/, and this /h/ neutralizes the /ə/ vs. /ɑ/ distinction to the lower vowel [ɑ] (H & H 1989:180). The fact that /h/s that descended from *\/k/ fail to cause neutralization of /ə/ and /ɑ/ confirms that this effect is historical (190). There are 52 varieties that contain at least one uvular and at least one glottal consonant with no pharyngeals, and only in the Samish dialect of Straits Salish do all segments in both places pattern together (to lower adjacent /i/). In at least 4 such varieties, uvulars cause effects on vowels to the exclusion of all other consonants, including glottals. If one posits an innate guttural natural class for the post-velars, then uvulars and glottals are not predicted to pattern differently when they co-occur.

Based on the fact that uvulars and glottals do not cohere into a natural class in most languages where they co-occur and where pharyngeals are absent, pharyngeals appear to be the core, definitional members of the guttural natural class. Being articulatorily midway between uvulars and glottals, they bear phonetic similarities to both and seem to draw uvulars and glottals in to pattern with them. This idea provides an explanation for why uvulars and pharyngeals could pattern together to the exclusion of glottals, as in the Interior Salish languages (Bessell 1992, but cf. Rose 1996), and why pharyngeals and glottals could pattern together to the exclusion of uvulars.

Having a pharyngeal consonant seems to be a necessary, but not sufficient, condition on having a guttural natural class. In 17 of the 30 varieties in P-base that contain pharyngeals and either uvulars, glottals, or both, there is evidence for a guttural natural class in the form of at least one phonological pattern that unifies pharyngeals with uvulars and/or glottals. In the other 13 varieties and in many other languages not included in P-base, pharyngeals exist, often alongside uvulars and glottals, but there is no evidence from phonological patterns for a guttural natural class. While the possibility of omissions in the descriptive literature cannot be dismissed, any reliable example of a language with pharyngeals and uvulars and/or glottals that does not show natural class behavior is

damaging to the hypothesis of an innate and universal guttural natural class.

These typological facts are problematic only to the claim that the guttural natural class is innate and universal. A host of other evidence (including McCarthy 1994, H & H, and Bessell 1992, among others) confirms that a guttural natural class exists in some languages. The alternative advocated here is to treat the guttural natural class as emergent by defining classes of segments with reference only to the phonological patterns in a given language (Mielke 2008:9). The emergentist view does not claim that there is a universal guttural natural class, which renders the typological facts unproblematic. Instead, in languages without evidence for a guttural natural class, no class will be posited, and in languages with such evidence, the relevant patterns will define the class.

The approach argued for here can be formalized by defining classes using an emergentist logic and grouping the resulting features using Padgett's (2002) feature classes (and in some cases language-specific feature geometries). By grouping features themselves rather than feature geometric nodes, feature classes are able to capture the insights of standard feature geometry while allowing the formalization of classes that standard feature geometry cannot capture but are otherwise well-motivated in a language (82). These feature classes and their constituent features can then be referenced by theoretical machinery such as Optimality Theory constraints.

In the emergentist approach of Mielke (2008), features can be abstract and language-specific because they denote a phonologically active class in a language regardless of whether that class is phonetically natural. While this is necessary for formally capturing phonetically unnatural or 'crazy' classes like *ruki* in Sanskrit, this study advocates using empirically verifiable articulatory and acoustic phonetic properties as features whenever possible. Recent advances in the articulatory phonetics of post-velar articulations have provided new explanations for phonological connections between pharyngeals, uvulars, and glottals (Moisik and Esling 2011).

Variation in the composition of the guttural natural class across languages is a problem for standard feature geometry, since every variation from a predicted guttural natural class must be accounted for. However, an emergentist account builds this variation into the definition of the class for each language and provides a much better fit with cross-linguistic data by describing typology rather than attempting to predict it (Mielke 2008:112). An emergentist approach provides a strong incentive for phonologists to find explanations for the full range of cross-linguistic phonological patternings of post-velar consonants because it allows those explanations to formally serve as the basis for (possibly new) features that can be integrated into current phonological theories.

References

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