

## Spread glottis and [spread glottis]

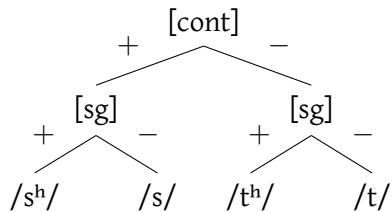
Aspiration has traditionally been analyzed as the presence of the laryngeal feature [+spread glottis] ([+sg]) on a consonant. Recent work on the phonological representation of fricatives argues that the unmarked featural specification for these obstruents is [+spread glottis] if they are voiceless, and [-spread glottis] if voiced. This position is supported by a variety of evidence, including synchronic phonological processes in Armenian and Spanish, and diachronic processes in Pāli and Thai; in these languages, /s/ patterns with the aspirated stops in spreading a [+sg] feature to adjacent consonants, or is grouped with aspirated stops in tonogenesis. (e.g., Vaux, 1998a; Beckman & Ringen, 2009; Nicolae & Nevins, 2010; Vaux & Miller, 2011).

In this talk, I discuss how this perspective relates to a puzzling cross-linguistic gap: while voiceless stops and affricates show aspiration contrasts (e.g., /t/ vs. /t<sup>h</sup>/; /ts/ vs. /ts<sup>h</sup>/) fairly often, contrasts in aspiration on voiceless fricatives (e.g., /s/ vs. /s<sup>h</sup>/) are surprisingly rare. Using databases like the UCLA Phonological Segment Inventory Database (UPSID; Maddieson & Precoda, 1990) or Mielke's P-Base (2008), we can get a general sense of the distribution of these phonemes: out of all the languages that have an aspiration contrast in their voiceless obstruents, just under 1% have this contrast on fricatives.

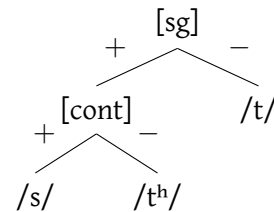
Why are contrasting aspirated and unaspirated fricatives so unusual, when they appear to coexist peacefully in some languages' phonologies? Can this pattern be explained phonologically using markedness, building on the strong tendency for /s/ to be [+spread glottis]? I argue that a separate principle underlies both the unmarked [+sg] status of /s/ and the rarity of fricative aspiration contrasts, and that it is articulatory rather than phonological in nature.

In order to demonstrate this conclusion, I develop a theoretical typology of fricative aspiration, and investigate empirically whether the predicted phonological systems are actually attested in the world's languages. Under Modified Contrastive Specification (e.g., Dresher, 2009), hierarchical ranking of the features [continuant] and [spread glottis] can determine the kinds of phonological patterns that we should observe; for a language with the ranking in (2), for instance, we would expect to see evidence of /s/ and /t<sup>h</sup>/ patterning together.

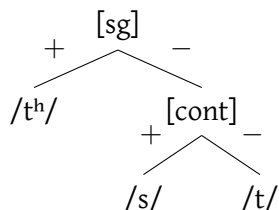
(1) *Contrastive aspiration /s s<sup>h</sup>/*



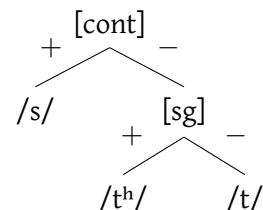
(2) *Phonologically aspirated /s/*



(3) *Phonologically unaspirated /s/*



(4) */s/ unspecified for aspiration*



Using data from Burmese, Karen, Thai, New Julfa Armenian, and Mazatec, I discuss these patterns, and reveal an asymmetry: languages with the ranking in (3), where /s/ is phonologically [-spread glottis], are largely absent (Thein-Tun, 2010; Jones, 1961; Gedney, 1972; Vaux, 1998b; Golston & Kehrein, 1998).

As aspiration contrasts on fricatives are phonologically possible but infrequently attested, we must conclude that they are permissible but dispreferred for articulatory or acoustic reasons. The “unmarked” nature of [+spread glottis] fricatives is not an abstract phonological tendency, but is based in articulatory requirements: the glottis needs to be spread to maintain sufficient airflow for frication (Stevens, 2000). I therefore conclude that this articulatory spread glottis results in phonological [+spread glottis] being preferred for /s/, should /s/ become specified for this feature. This articulatory influence on phonological specification provides an explanation for both the trends noted by Vaux and Miller (2011) and the typological rarity of languages where voiceless fricatives are [-sg], be it independently or in contrast with [+sg] aspirated fricatives. This research displays the usefulness of hierarchical feature ranking in assessing the types of phonological patterns that we expect to be able to find in the world’s languages, and brings additional evidence to bear on the notion of how contrastive features can interact with phonetic and articulatory factors.

## References

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