Phonology without markedness constraints

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ICLaVE 3, Amsterdam, 25 June 2005

Fugitive /g/ (Boersma 1989) in the presence of unaspirated /k/

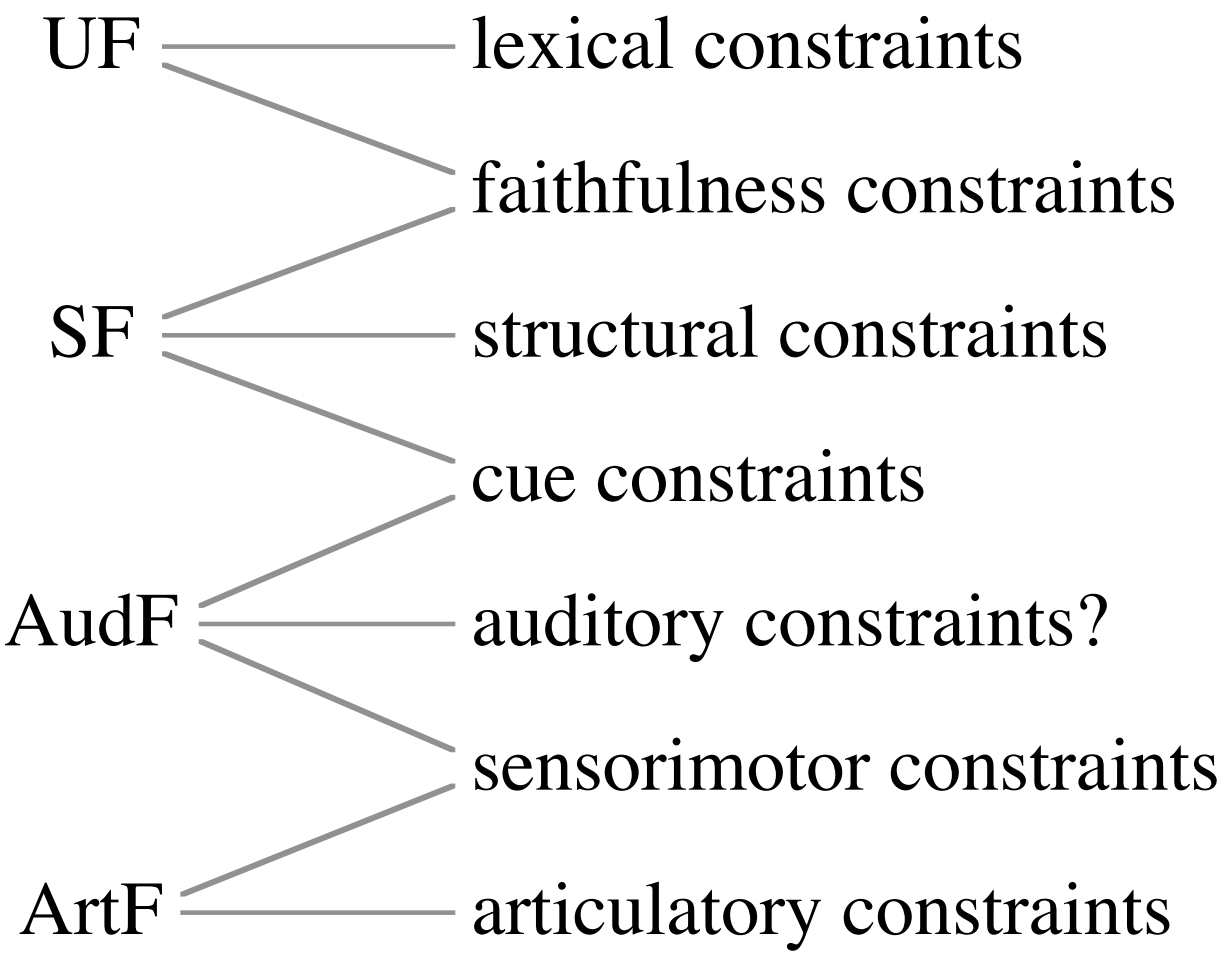
- g → ɦ (Czech, Slovak, Ukranian)
- g → ɣ (Dutch vs. other Germanic)
- g → dʒ (Arabic)
- g → ŋ (Japanese)
- counterexamples to Ohala/Blevins' 'innocent misapprehension' theory?

On the observational level: enhancement of /g/-/k/ contrast

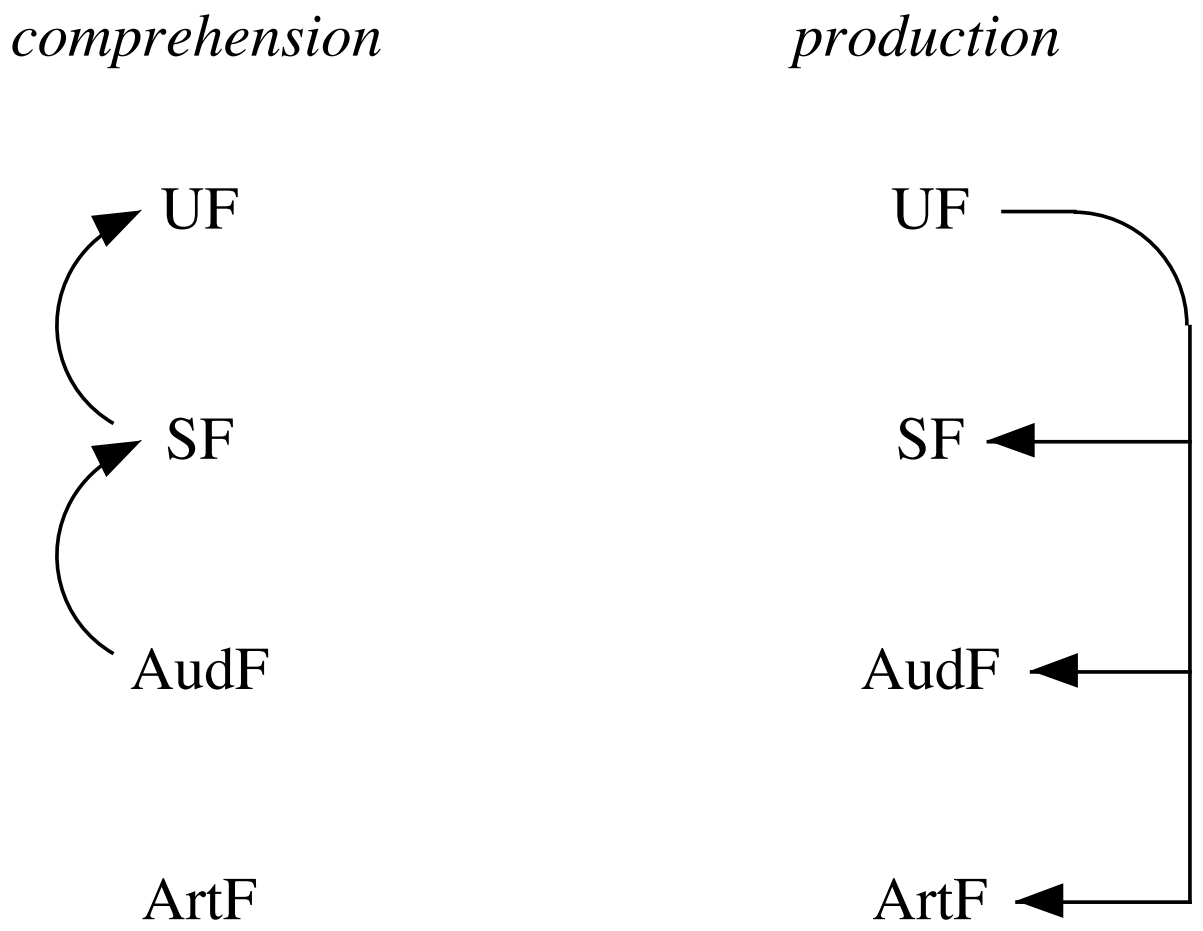
- g → { ɦ, ɣ, dʒ, ŋ } increases voicing.
- Teleology, observationally.

- This talk will show, however, that an underlying blind mechanism could handle these facts.

Grammar: markedness is implicit



Processes:
parallel phonology & phonetics



Faithfulness constraints

- ID-voice:

  *|–voi|/+voi/

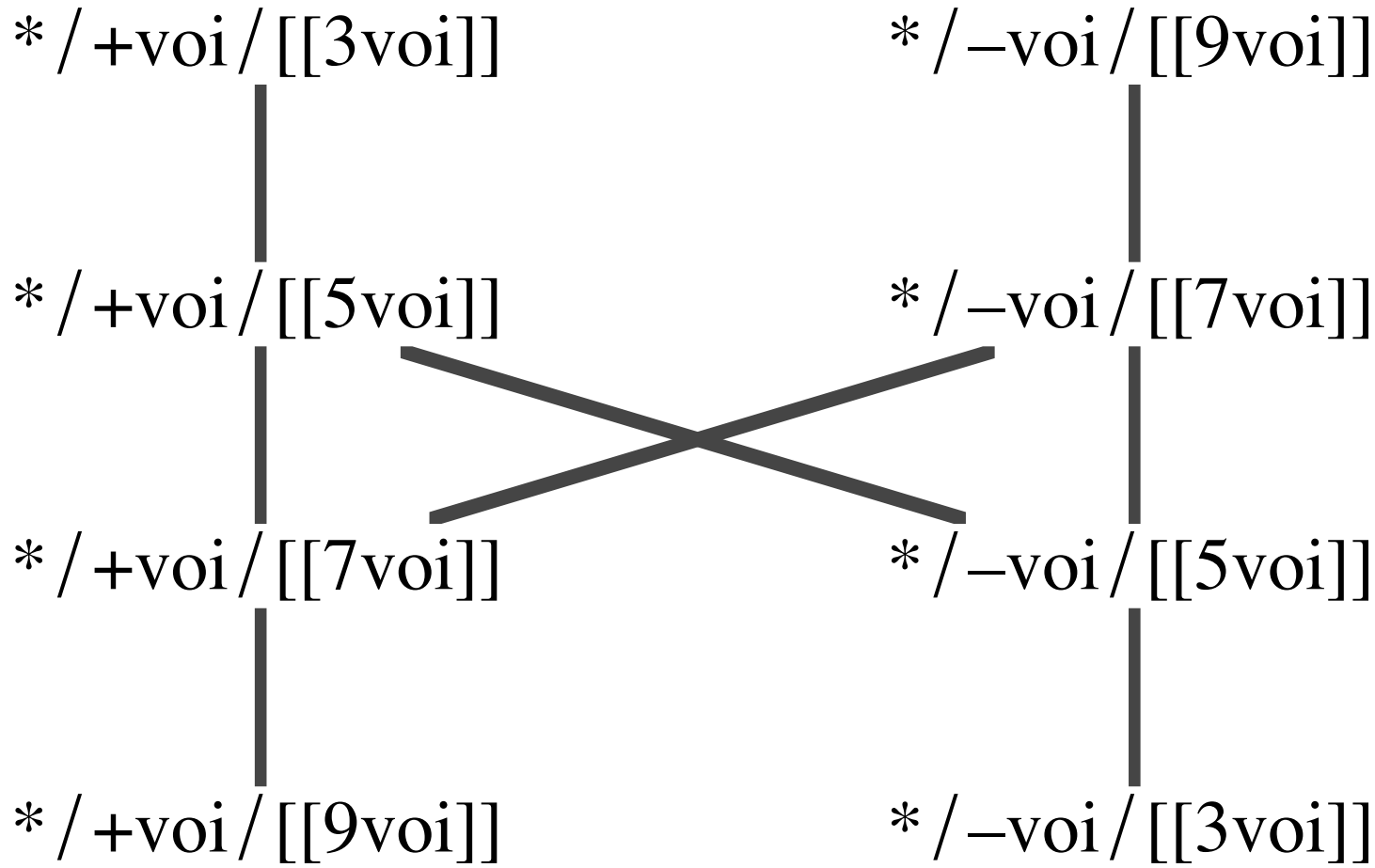
  *|+voi|/–voi/

Cue constraints (e.g. Escudero & Boersma 2004)

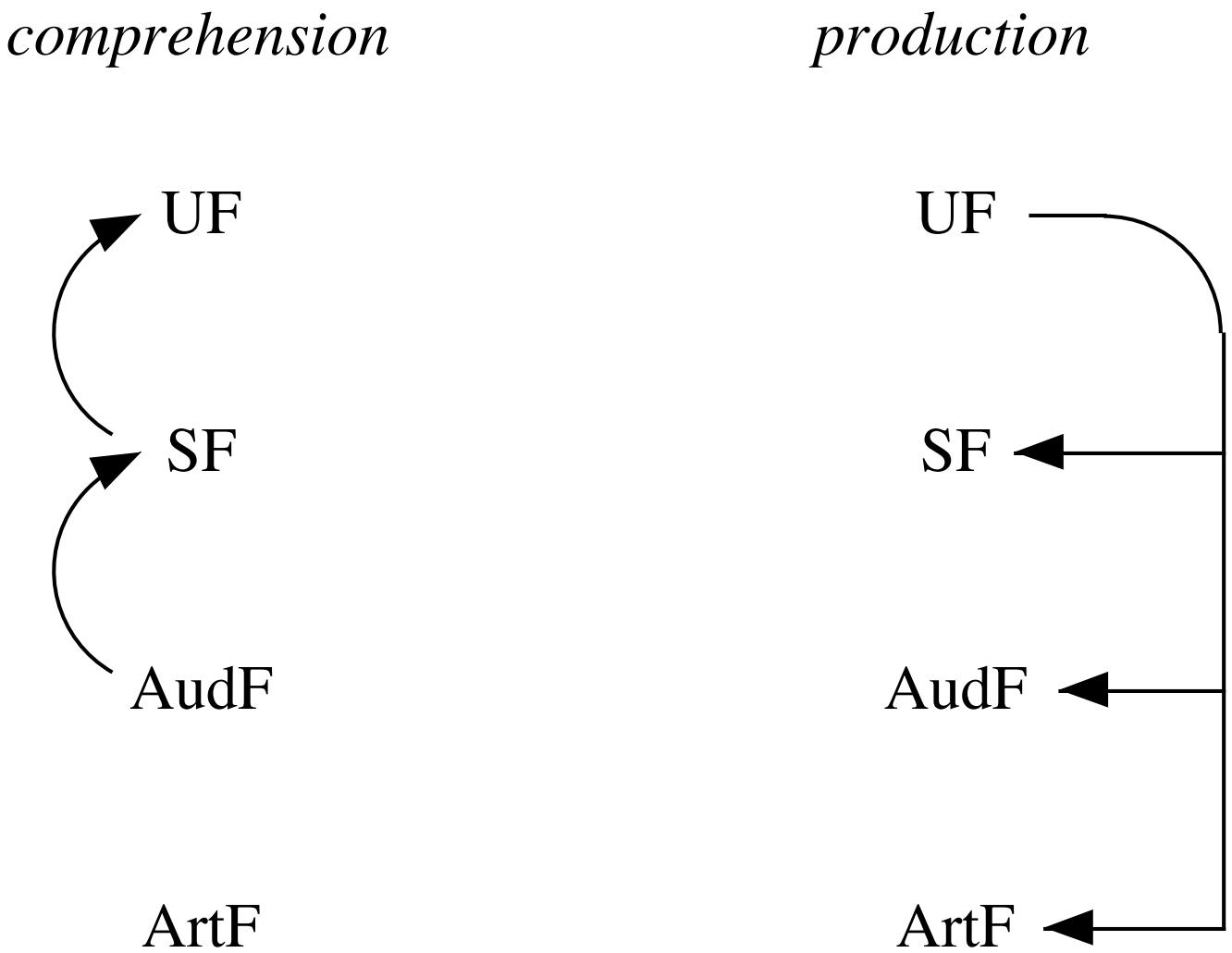
- */+voi/[[0voi]]
- */+voi/[[1voi]]
- ...
- */+voi/[[9voi]]

- */–voi/[[0voi]] ... */–voi/[[9voi]]

Example cue ranking



Perception: modular



Perception

- [[3voi]] → /–voi/ nearly always
- [[9voi]] → /+voi/ nearly always
- [[5voi]] → /–voi/ most of the time
- [[7voi]] → /–voi/ most of the time

Sensorimotor constraints

- ... reflect knowledge of relation between sound and articulation.
- Their ranking is acquired by practice (speaking, vocal play).
- For simplification, I assume that the s.m. constraints are ranked ‘perfectly’.

Perfect sensorimotor rankings

- Possible combinations are low-ranked:

  *[[9voi]] [dorvel, plosvoieffort=22]

  *[[7voi]] [dorvel, plosvoieffort=18]

  *[[5voi]] [dorvel, plosvoieffort=14]

- Impossible combinations are high-ranked:

  *[[7voi]] [dorvel, plosvoieffort=22]

  *[[9voi]] [dorvel, plosvoieffort=18]

Low sensorimotor constraints

*[[9voi]] [dorvel, plosvoieffort=22]

*[[9voi]] [coralv, plosvoieffort=18]

*[[9voi]] [bilab, plosvoieffort=14]

*[[7voi]] [dorvel, plosvoieffort=18]

*[[5voi]] [dorvel, plosvoieffort=14]

*[[3voi]] [dorvel, plosvoieffort=10]

Simplify GEN
because of perfect s.m. ranking

Allow only perfect candidates in tableaus, i.e. those containing the following phonetic parts:

[9dorplos22],

[7dorplos18], [9corplos18],

[5dorplos14], [7corplos14], [9labplos14],

[3dorplos10], [5corplos10], [7labplos10]

Fixed articulatory ranking

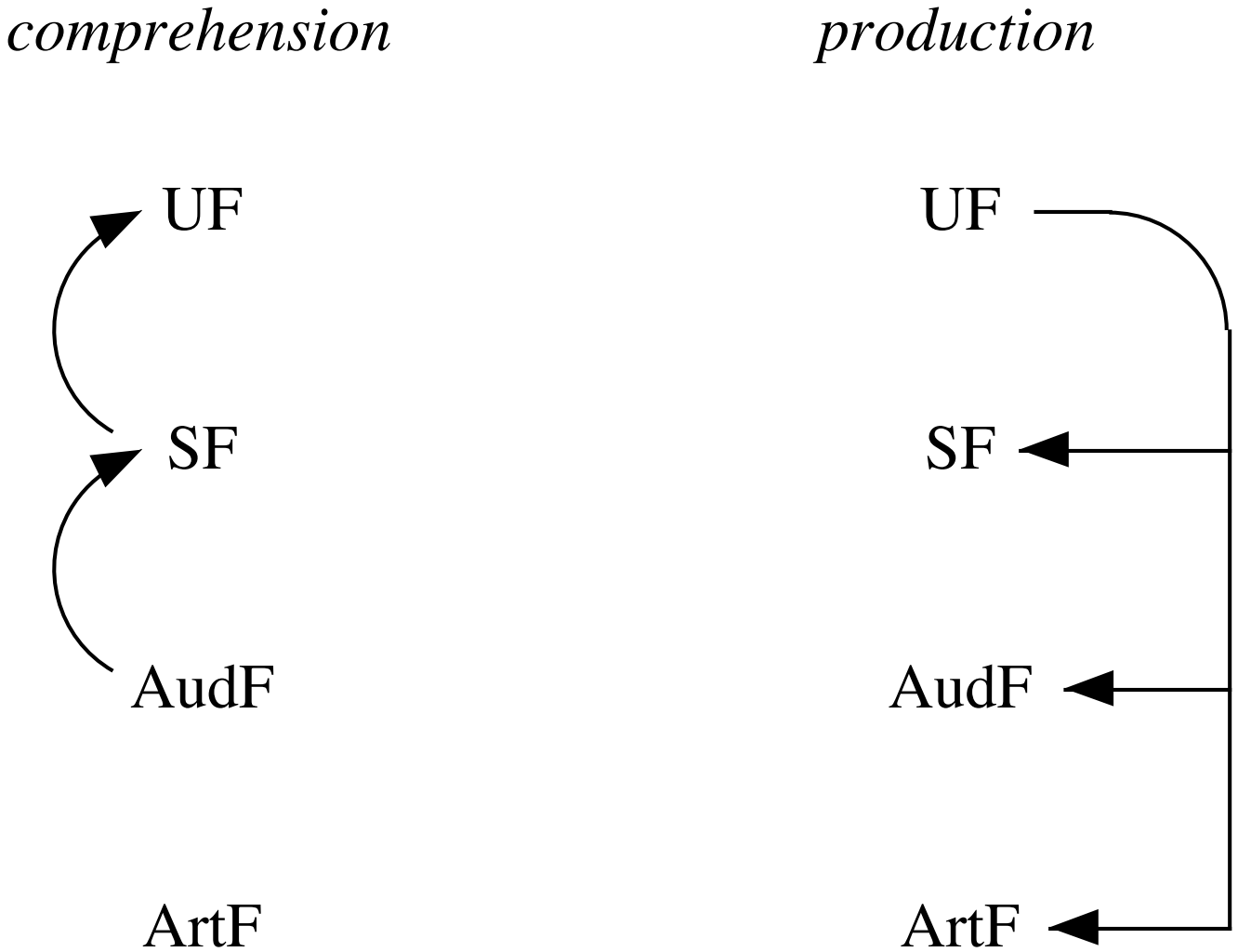
*[plosvoieffort=22] >>

*[plosvoieffort=18] >>

*[plosvoieffort=14] >>

*[plosvoieffort=10]

Production: parallel



Production

- There is a ranking of ID-voice, cue and *ART constraints that leads to

  |dorplos,+voi| → /+voi/[7dorplos18]

  |corplos,+voi| → /+voi/[8corplos16]

  |labplos,+voi| → /+voi/[9labplos14]

- The dorsal is both less voiced than the labial, and more effortful.

Spirantization facilitates voicing

(spirant = fricative or approximant)
Remaining s.m.-perfect phonetic candidates:

[9dorspir18],

[7dorplos14], [9corplos14],

[5dorplos10], [7corplos10], [9labplos10]

An additional faithfulness constraint:

ID-manner, i.e. *|plos|/spir/

There exists a ranking...

There exists a ranking of ID-voice, ID-manner, cue and *ART constraints that leads to

|dorplos,+voi| → /+voi/[8dorspir16] = [ɣ]

|corplos,+voi| → /+voi/[8corplos16] = [d]

|labplos,+voi| → /+voi/[9labplos14] = [b]

With evaluation noise

Labials: voiceless 0.1%, spirantized 4.6%

Coronals: voiceless 3.9%, spirantized 24.5%

Dorsals: voiceless 15.2%, spirantized 49.0%

Naive ‘innocent misapprehension’ theory only predicts devoicing: the merger /g/ → /k/.

The current equally non-teleological ‘bidirectional constraint use’ theory also predicts fugitive /g/ → /ɣ/.

Where are crazy rules?

- For some speakers, /g/ (i.e. /+voi, +dor, +plos/) at SF is pronounced as [ɣ] at ArtF.
- Some learners interpret the AudF [ɣ] as the SF /+voi, +dor, –plos/.
- These learners may introduce a language-specific structural constraint */+voi, +dor, +plos/ at SF.
- Such a constraint is not less natural than, say, */–voi, +dor, +plos/.

Conclusion

- This is how phonologization works in parallel bidirectional phonology & phonetics.
- We find natural rules only at ArtF and AudF, and rules at SF are arbitrary.
- Because of phonologization, the structure /g/ is uncommon at SF, but there is no markedness constraint */g/ at SF.

So?

- So you have ‘crazy’ reconstructed proto-Indo-European with /ɡ/ but not /b/ at SF, against the markedness correlation, because of a change like /t’, c’, k’/ → /d, ɟ, ɡ/ that is unrelated to the high ranking of the articulatory constraint against implementing a very voiced [g].
- No markedness constraints, no teleology.

Parallel bidirectional phonology and phonetics