The heuristic of Economy and the reflexes of Proto-Iranian stop clusters
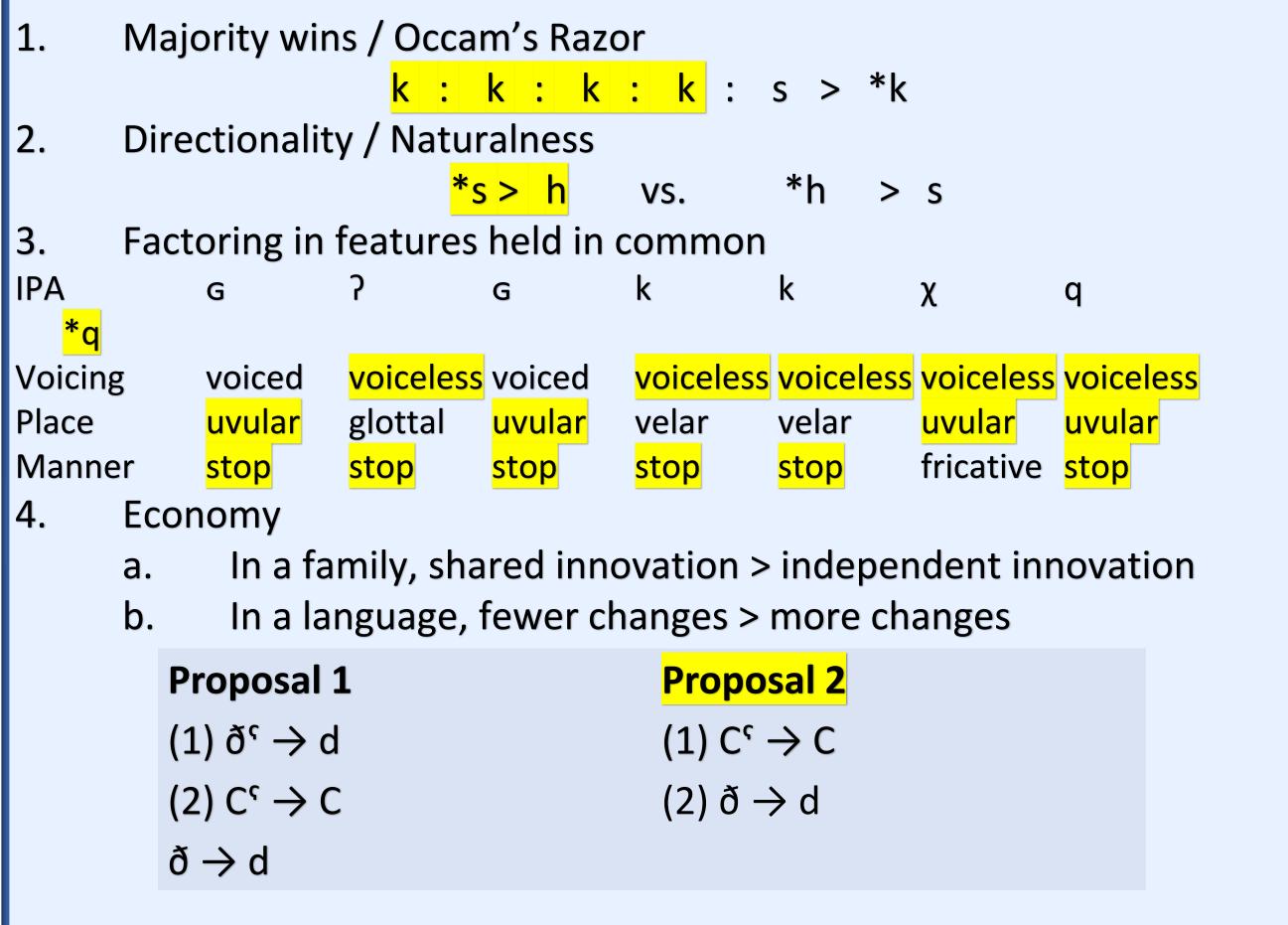## Shuan Osman Karim, Goethe University Frankfurt

This presentation in a nutshell:

- The reflexes of Proto-Indo-Iranian consonant clusters is well known from the extant Old, Middle, and New Indic, Iranian, and Nuristani languages.
- Voiceless-stop-laryngeal clusters become fricatives in Iranian, voiceless stops in Nuristani, and Voiceless aspirated stops in Indic:
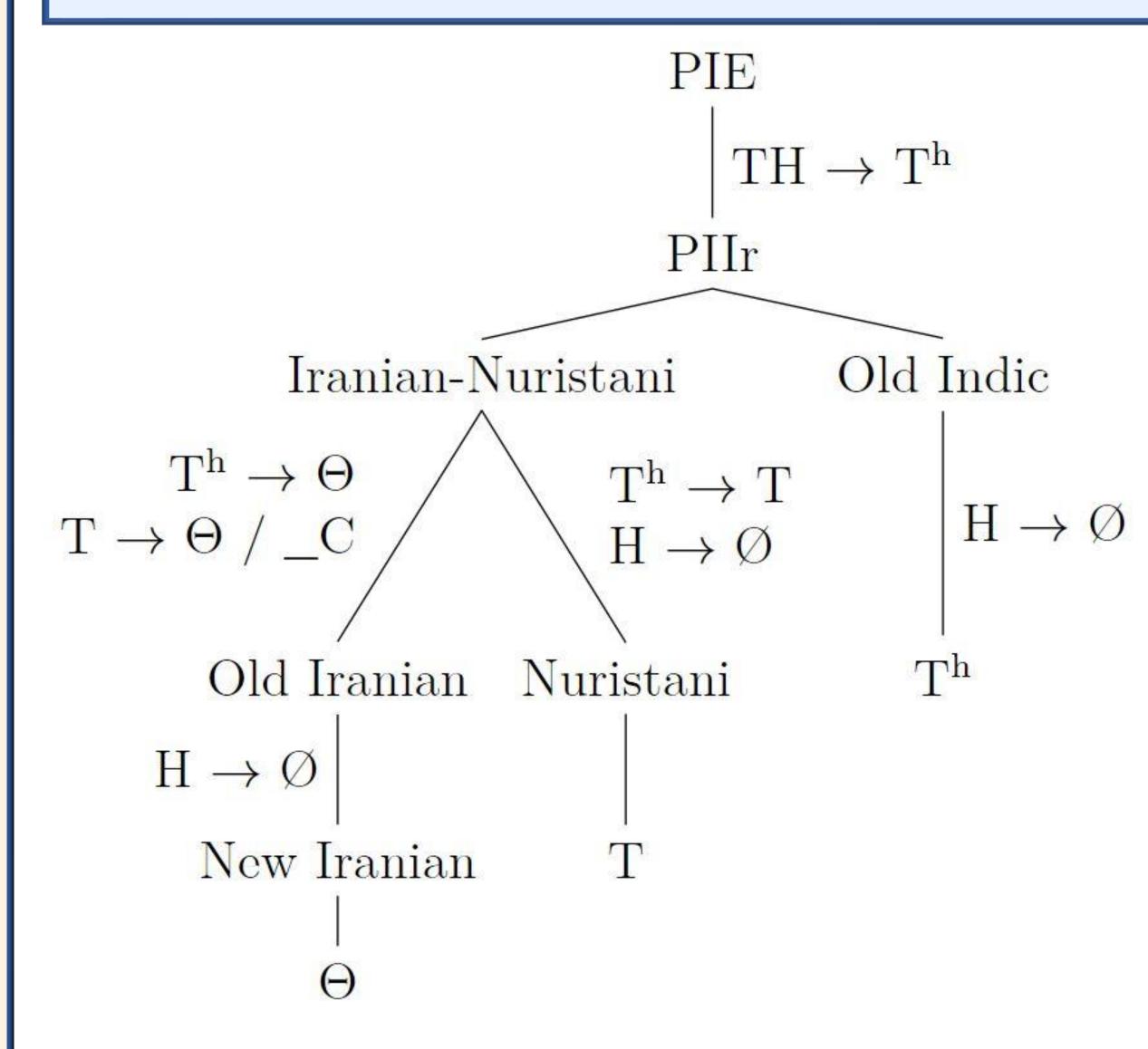
PIE	PIIr.	Iranian	Nuristani	Indic
*pH	*pʰ	f	p	pʰ
*tH	*tʰ	θ	t	tʰ
*kH	*kʰ	x	k	kʰ

- However, the conception that these clusters (TH) became fricatives in Iranian proves redundant as their transformation is subsumed under other known shifts, e.g., T > Θ and H > ∅.
- Likewise, the two sets of palatals Ḱ and K (before front vowels) are thought to have undergone a complex dance to avoid merger.
- This proves to be an unnecessary bulky solution given that each of these changes is subsumed under other known shifts.
- The comparative method gives us the necessary tools to evaluate the traditional proposals and the one I offer here.
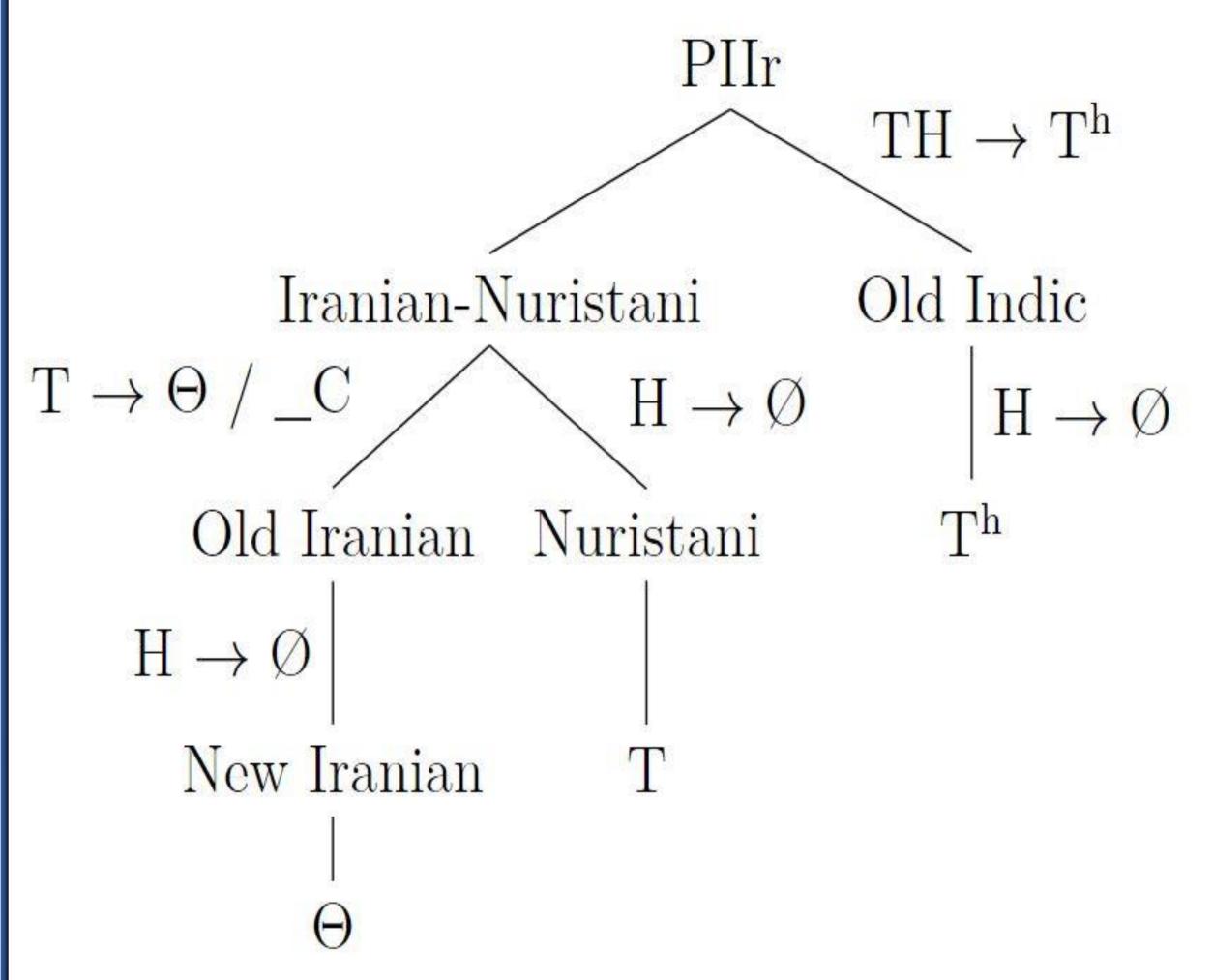
Heuristics for the justification of reconstruction:

1. Majority wins / Occam's Razor
$$k : k : k : k : s > *k$$
2. Directionality / Naturalness
$$*s > h \quad vs. \quad *h > s$$
3. Factoring in features held in common

IPA	ɢ	ʔ	ɢ	k	k	χ	q
							*q
Voicing	voiced	voiceless	voiced	voiceless	voiceless	voiceless	voiceless
Place	uvular	glottal	uvular	velar	velar	uvular	uvular
Manner	stop	stop	stop	stop	stop	fricative	stop

4. Economy
   a. In a family, shared innovation > independent innovation
   b. In a language, fewer changes > more changes

Proposal 1	Proposal 2
(1) ðᶜ → d	(1) Cᶜ → C
(2) Cᶜ → C	(2) ð → d
ð → d	

Standard solution for TH clusters

PIE
| TH → Tʰ
PIIr
Iranian-Nuristani — Old Indic
Tʰ → Θ / T → Θ / _C ... Tʰ → T / H → ∅ ... H → ∅
Old Iranian / Nuristani ... Tʰ
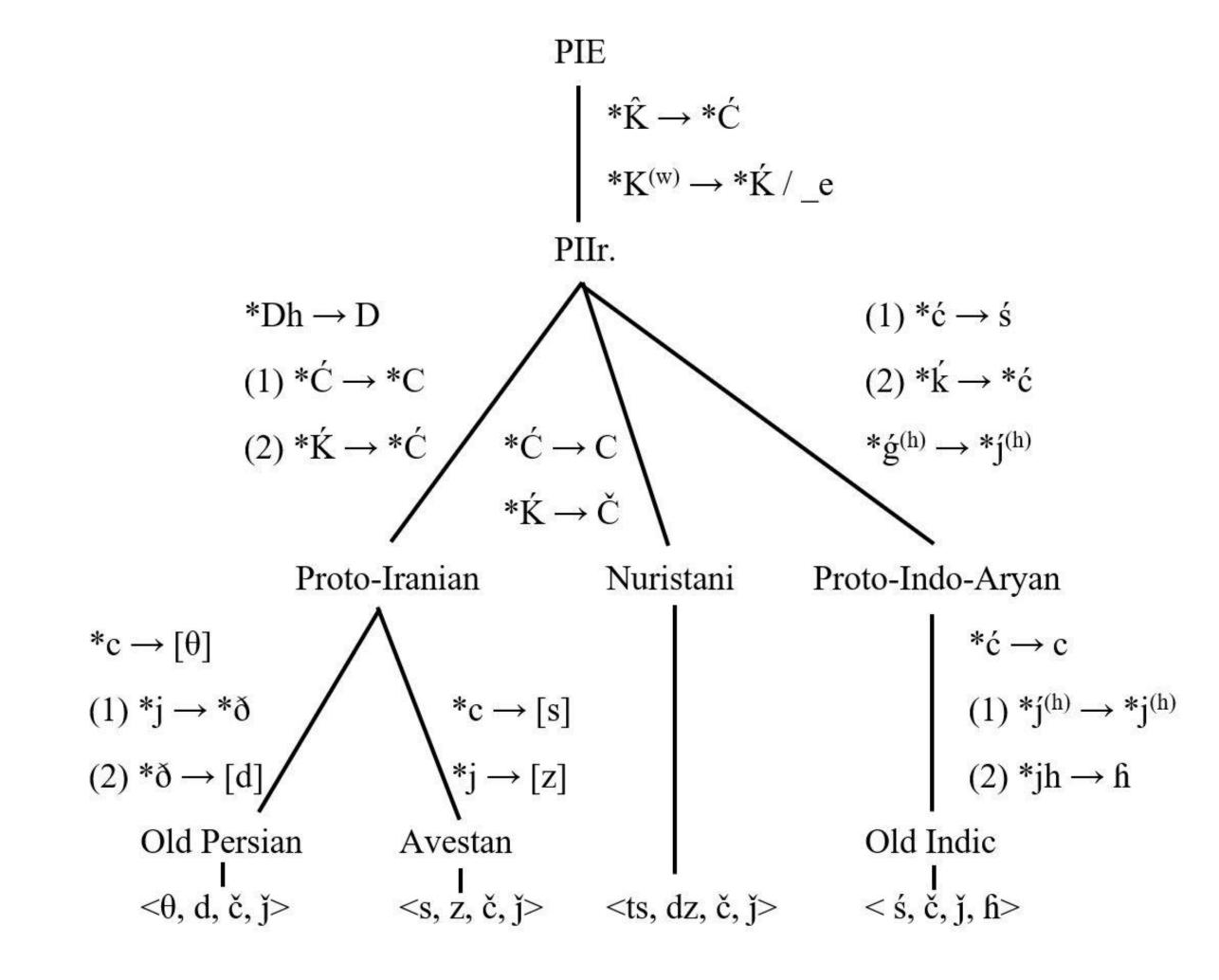H → ∅
New Iranian ... T
Θ

- Voiceless-stop-laryngeal aspirate so that they can deaspirate in Iranian and Nuristani.
- Laryngeals are lost on the way from Old Iranian to New Iranian: H > ∅ / C_V.
- Voiceless stops become aspirates before consonants: T > Θ / _C.
- A TH > Θ rule (with a medial Tʰ stage) is redundant.
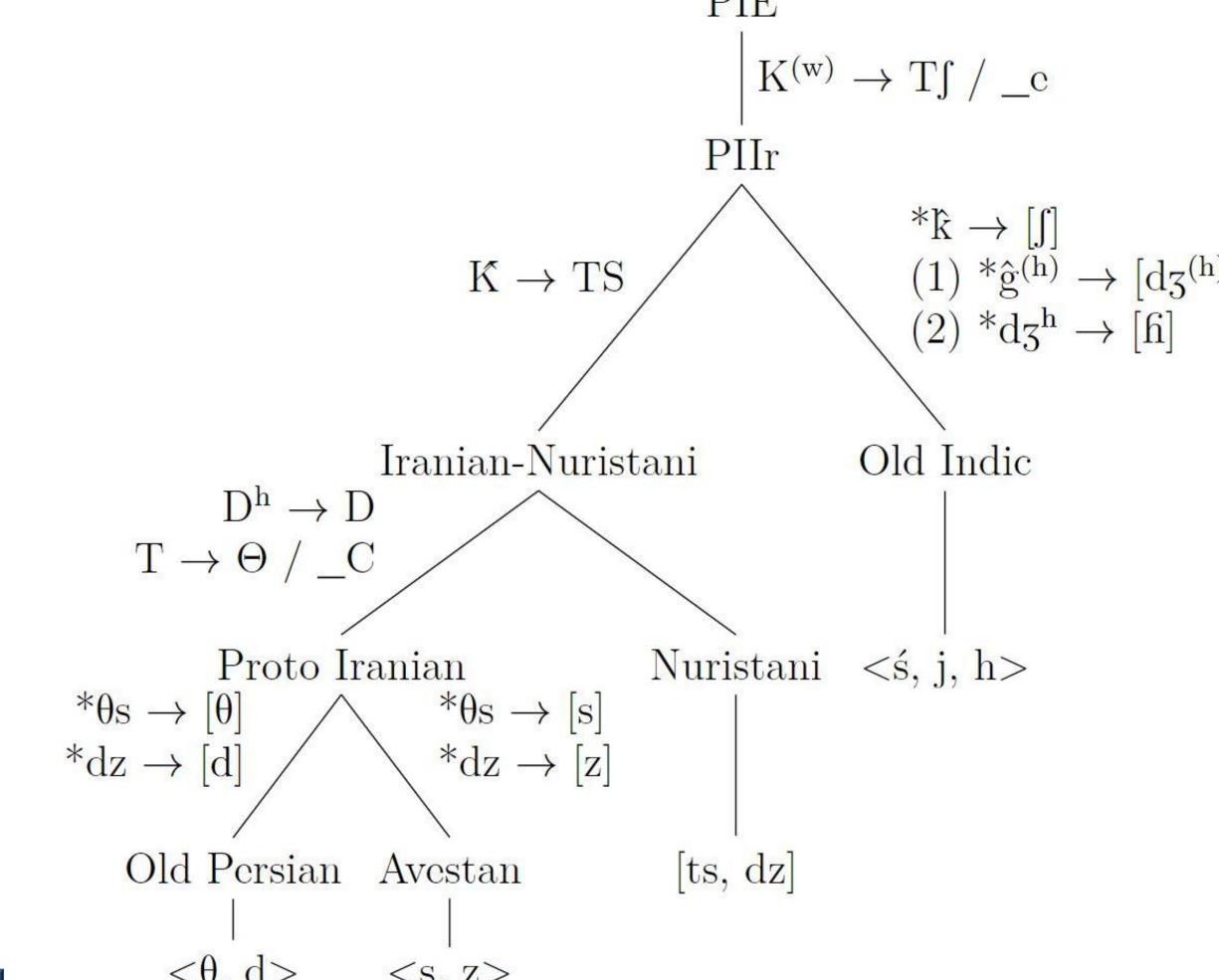
Economical solution for TH clusters

PIIr
| TH → Tʰ
Iranian-Nuristani — Old Indic
T → Θ / _C ... H → ∅ ... H → ∅
Old Iranian / Nuristani ... Tʰ
H → ∅
New Iranian ... T
Θ

Standard solution for palatal consonants

PIE
*Ḱ → *Ć
*K⁽ʷ⁾ → *Ḱ / _e
PIIr.
*Dh → D ... (1) *ć → ś
(1) *Ć → *C ... (2) *ḱ → *ć
(2) *Ḱ → *Ć ... *Ć → C ... *ǵ⁽ʰ⁾ → *j⁽ʰ⁾
*Ḱ → č
Proto-Iranian ... Nuristani ... Proto-Indo-Aryan
*c → [θ] ... *ć → c
(1) *j → *ð ... *c → [s] ... (1) *j⁽ʰ⁾ → *j⁽ʰ⁾
(2) *ð → [d] ... *j → [z] ... (2) *jh → ɦ
Old Persian ... Avestan ... Old Indic
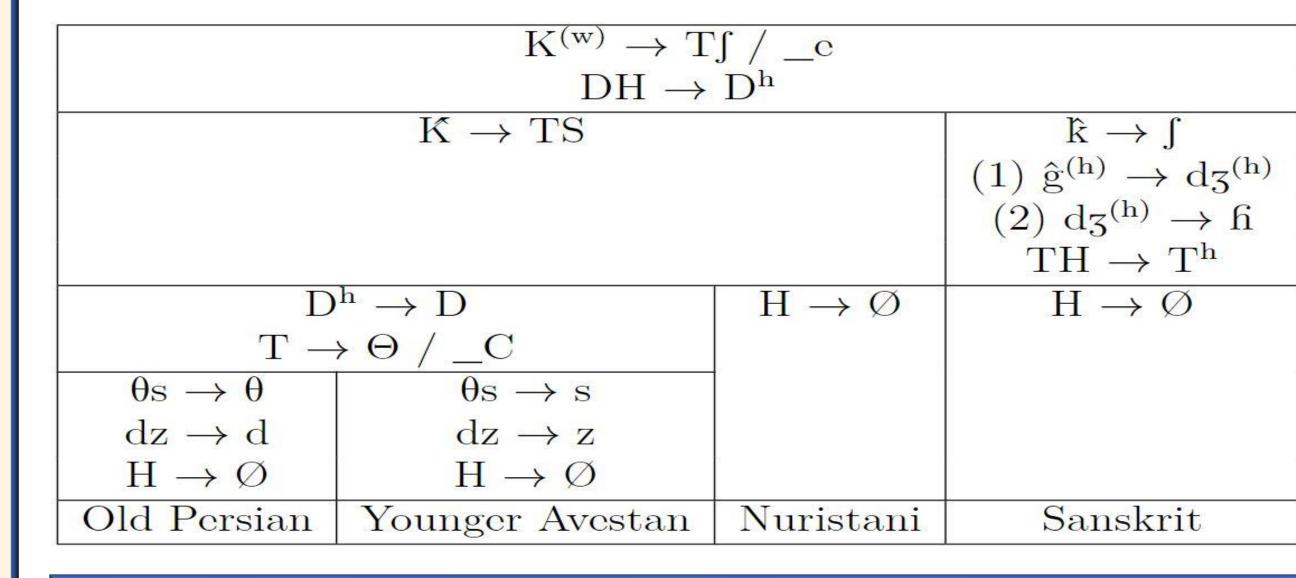<θ, d, č, ǰ> ... <s, z, č, ǰ> ... <ts, dz, č, ǰ> ... < ś, č, ǰ, ɦ>

- The dance:
  - Uralic borrows PIIr. palatovelars as velars and palatalized velars as alveo-palatals; thus,
    - Palatovelars move out of the way becoming palatal stops
  - while velars palatalize
  - This begins a chain shift
    - palatal stops become alveolar affricates
    - Palatalized velars become palatal stops (then alveo-palatal affricates)
    - Iranian breaks into two groups that deaffricate the alveolar affricates
  - In the Southwestern group,
    - [ts] > θ
    - [dz] > ð, but due to a lack of /ð/ it stops > d
  - Problems:
    - The complex dance is meant to prevent mergers. However, there is no evidence of any outcome of the palatalized velars other than alveo-palatal affricates
    - There is only a possibility of a merger in Indic, where the outcome of the voiceless palatovelar, [ʃ] is a fricative, not an affricate
    - There is no reason for *j > ð, *c > θ is already subsumed by the preconsonantal spirantization: T > Θ /_C

Economical solution for palatal consonants

PIE
| K⁽ʷ⁾ → Tʃ / _e
PIIr
*ǩ → [ʃ]
K → TS ... (1) *ĝ⁽ʰ⁾ → [dʒ⁽ʰ⁾]
(2) *dʒʰ → [ɦ]
Iranian-Nuristani ... Old Indic
Dʰ → D
T → Θ / _C
Proto Iranian ... Nuristani <ś, j, h>
*θs → [θ] ... *θs → [s]
*dz → [d] ... *dz → [z]
Old Persian ... Avestan ... [ts, dz]
<θ, d> ... <s, z>

Summary/Selected References

K⁽ʷ⁾ → Tʃ / _c			
DH → Dʰ			
K → TS		ǩ → ʃ	
		(1) ĝ⁽ʰ⁾ → dʒ⁽ʰ⁾	
		(2) dʒ⁽ʰ⁾ → ɦ	
		TH → Tʰ	
Dʰ → D		H → ∅	H → ∅
T → Θ / _C			
θs → θ	θs → s		
dz → d	dz → z		
H → ∅	H → ∅		
Old Persian	Younger Avestan	Nuristani	Sanskrit

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