The Developing Orthographic Conventions of Roman Hindi-Urdu

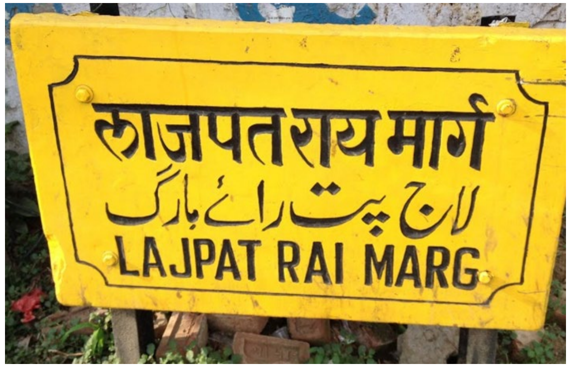
Saiya Karamali

Outline

1. Some background on Hindi and Urdu and why I’m treating them together
2. Background: How technology has impacted written language and what this tells us about written language broadly
3. A (brief) linguistic framework for analyzing written language
4. What I’ve found about the orthographic conventions of Hindi-Urdu
5. What these findings tell us about how a writing system might develop organically

Hindi and Urdu

- Indo-Aryan languages spoken in India and Pakistan
- Sociocultural divisions: Hindus overwhelmingly identify as Hindi speakers and Muslims normally identify as Urdu speakers
- Closely related; mainly differentiated by script
  - Devanagari (Hindi) vs. Perso-Arabic (Urdu)
- Official languages in India and Pakistan



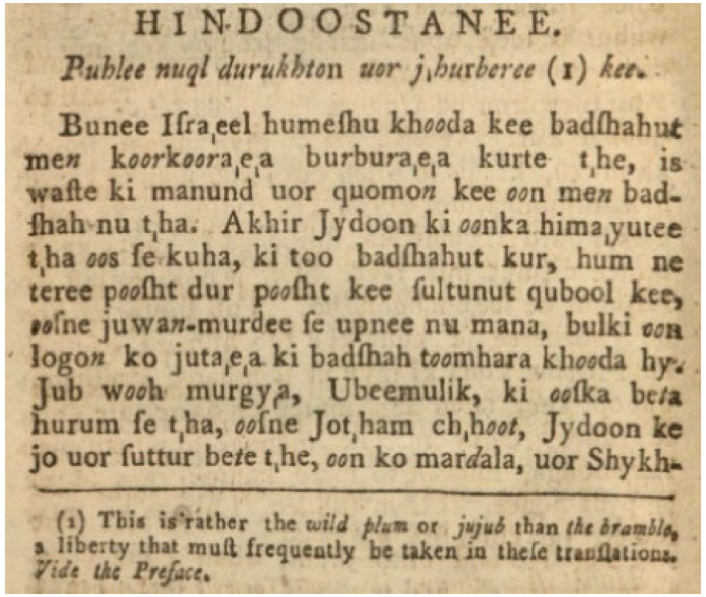
A multilingual street sign in India

A brief history of script choice in South Asia

- Both scripts have been in use in South Asia since the eleventh century, when Perso-Arabic was introduced
- Roman script was introduced by the British in the 19th century, but was largely rejected by the native population (Ahmad, 2011)
- 1800s, British India: Religious divisions grow and Hindi/Urdu script choice becomes a controversial issue
    - The British tried to introduce the Roman script, but it was largely rejected by the native population (Ahmad, 2011)
- 1900s: India/Pakistan become independent and adopt separate languages/scripts
- 1990s: English comes to be associated with economic prosperity and becomes the “language of the youth” (Nema & Chawla, 2018).

Early examples of Roman Hindi-Urdu

- Early use in the 1800s by European missionaries and British Indians
- Early pedagogical materials in Roman Hindi-Urdu: Rahman, 1923; Sharma, 1937



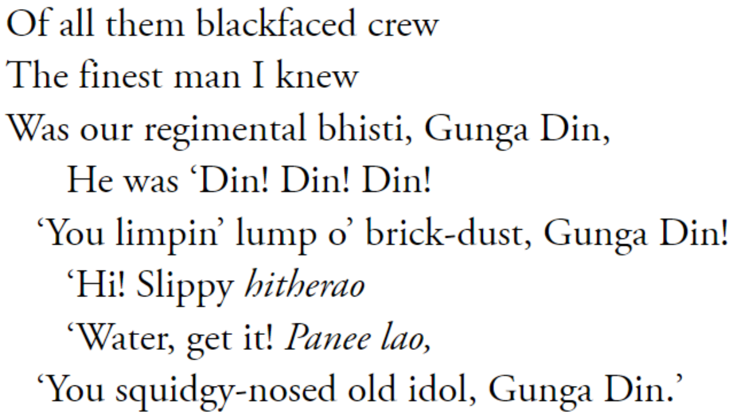
HINDOOSTANEE.

Publee nuql durukhton uor jˌhurberee (1) *kee.*

Bunee Iſraˌeel humeſhu kh*oo*da kee badſhahut me*n* k*oo*rk*oo*raˌeˌa bur*b*uraˌeˌa kurte tˌhe, is waſte ki manund uor quomo*n* kee *oo*n me*n* badſhah nu tˌha. Akhir Jydoon ki *oo*nka himaˌyutee tˌha *oo*s ſe kuha, ki too badſhahut kur, hum ne teree p*oo*ſht dur p*oo*ſht kee ſultunut qubool kee, *oo*ſne juwa*n*-murdee ſe upnee nu mana, bulki *oo*n logo*n* ko jutaˌeˌa ki badſhah t*oo*mhara kh*oo*da hy. Jub w*oo*h murgyˌa, Ubeemulik, ki *oo*ſka be*t*a hurum ſe tˌha, *oo*ſne JotˌHam chˌh*oo*t, Jydoon ke jo uor ſuttur be*t*e tˌhe, *oo*n ko mar*d*ala, uor Shykh-

(1) This is rather the *wild plum* or *jujub* than *the bramble*, a liberty that muſt frequently be taken in theſe tranſlations. *Vide the Preface.*

Gilchrist (1803): Fable I, *The Trees and the Bramble*



Of all them blackfaced crew
The finest man I knew
Was our regimental bhisti, Gunga Din,
He was 'Din! Din! Din!
'You limpin' lump o' brick-dust, Gunga Din!
'Hi! Slippy *hitherao*
'Water, get it! *Panee lao*,
'You squidgy-nosed old idol, Gunga Din.'

Kipling (1890): *Gunga Din*

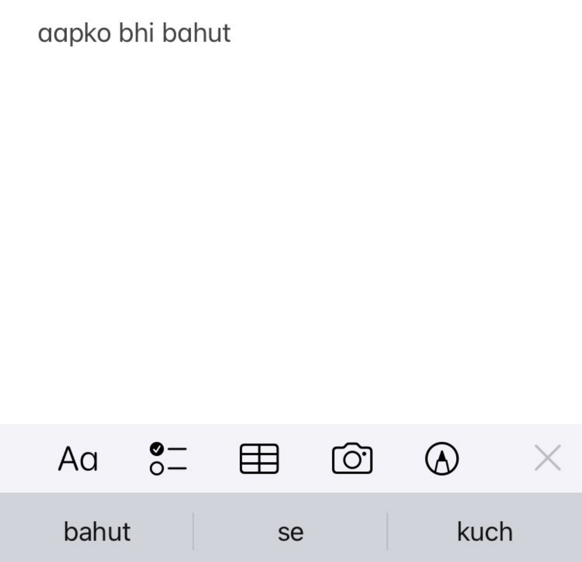
Background: written language and technology

- Technology has led several languages to adopt the Roman (Latin) script
- Some languages have done so reluctantly (i.e. Greek; Mouresioti & Terkourafi, 2021), and have taken advantage of increased tools for typing in traditional scripts
- Hindi-Urdu, by contrast, seems to have embraced the Roman script
  - Bali et al., 2014: 84% of Hindi Facebook posts were written in the Roman script

Why is Roman Hindi-Urdu so popular?

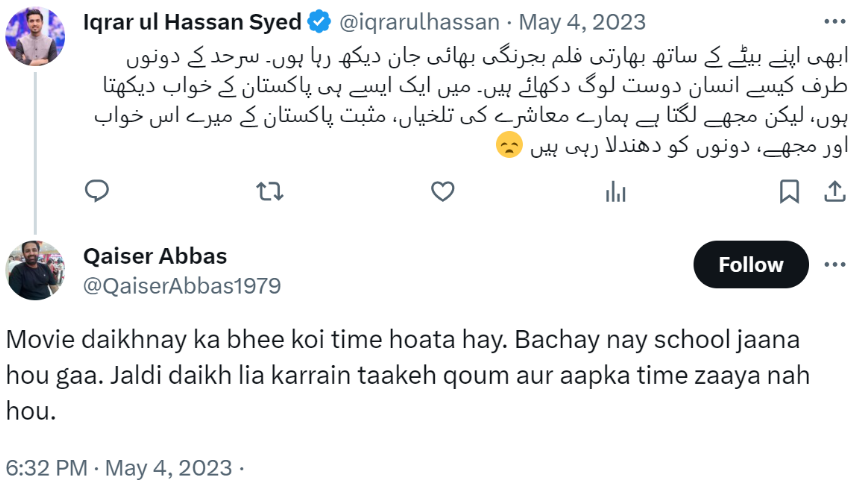
- Some possibilities:
  - Increased prestige of English in South Asia
  - The use of English as a *lingua franca*
  - “Hybrid Identity” of South Asians as a result of colonization and Western influence (Atta, 2021)
  - New ways of expressing linguistic identity outside of script choice?

Roman Hindi-Urdu today: digital forms



aapko bhi bahut

Screenshot from iOS Hindi (Latin) keyboard



Iqrar ul Hassan Syed @iqrarulhassan · May 4, 2023

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طرف کیسے انسان دوست لوگ دکھائے ہیں۔ میں ایک ایسے ہی پاکستان کے خواب دیکھتا
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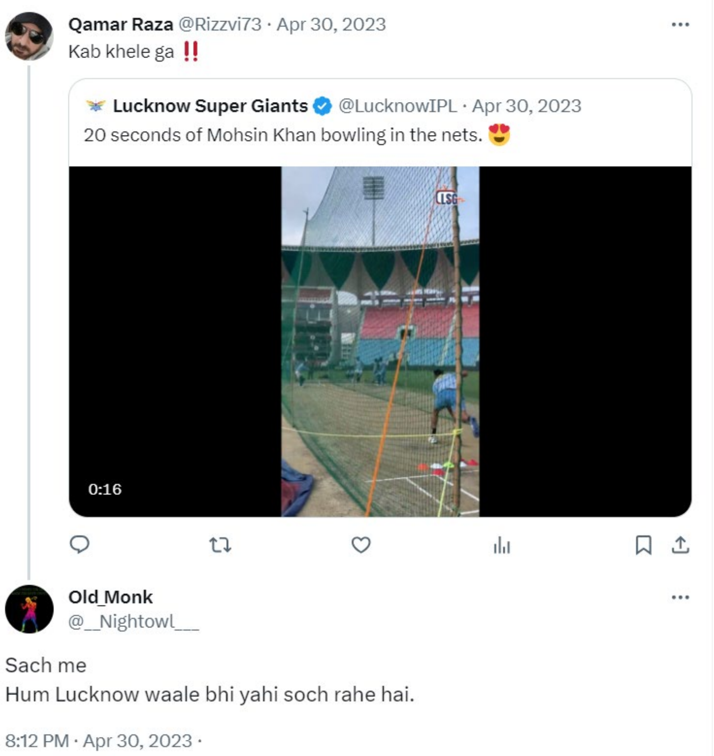
Qaiser Abbas
@QaiserAbbas1979

Movie daikhnay ka bhee koi time hoata hay. Bachay nay school jaana hou gaa. Jaldi daikh lia karrain taakeh qoum aur aapka time zaaya nah hou.

6:32 PM · May 4, 2023 ·

“Watching a movie takes time too. The kids need to go to school. Watch it quickly so neither your nor the nation’s time is wasted.”



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Kab khele ga ‼️

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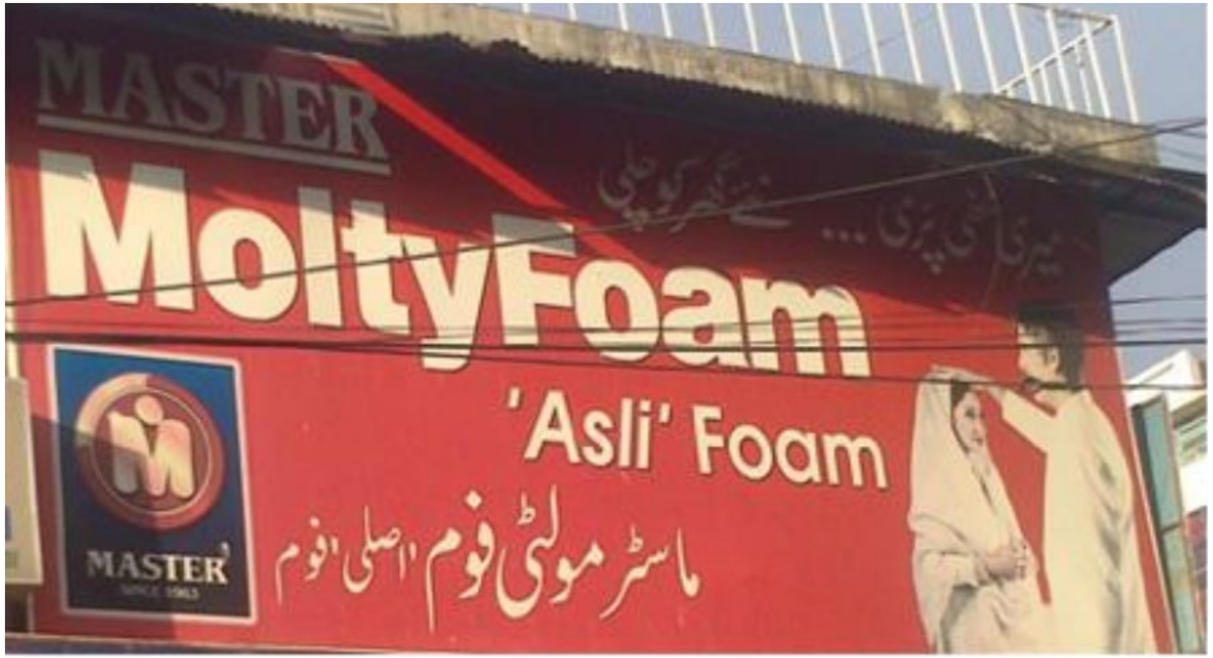
“Seriously, we’ve been wondering the same here in Lucknow”

Roman Hindi-Urdu today: linguistic landscapes



Advertisement in Rawalpindi, Pakistan
Photo: Atta, 2021

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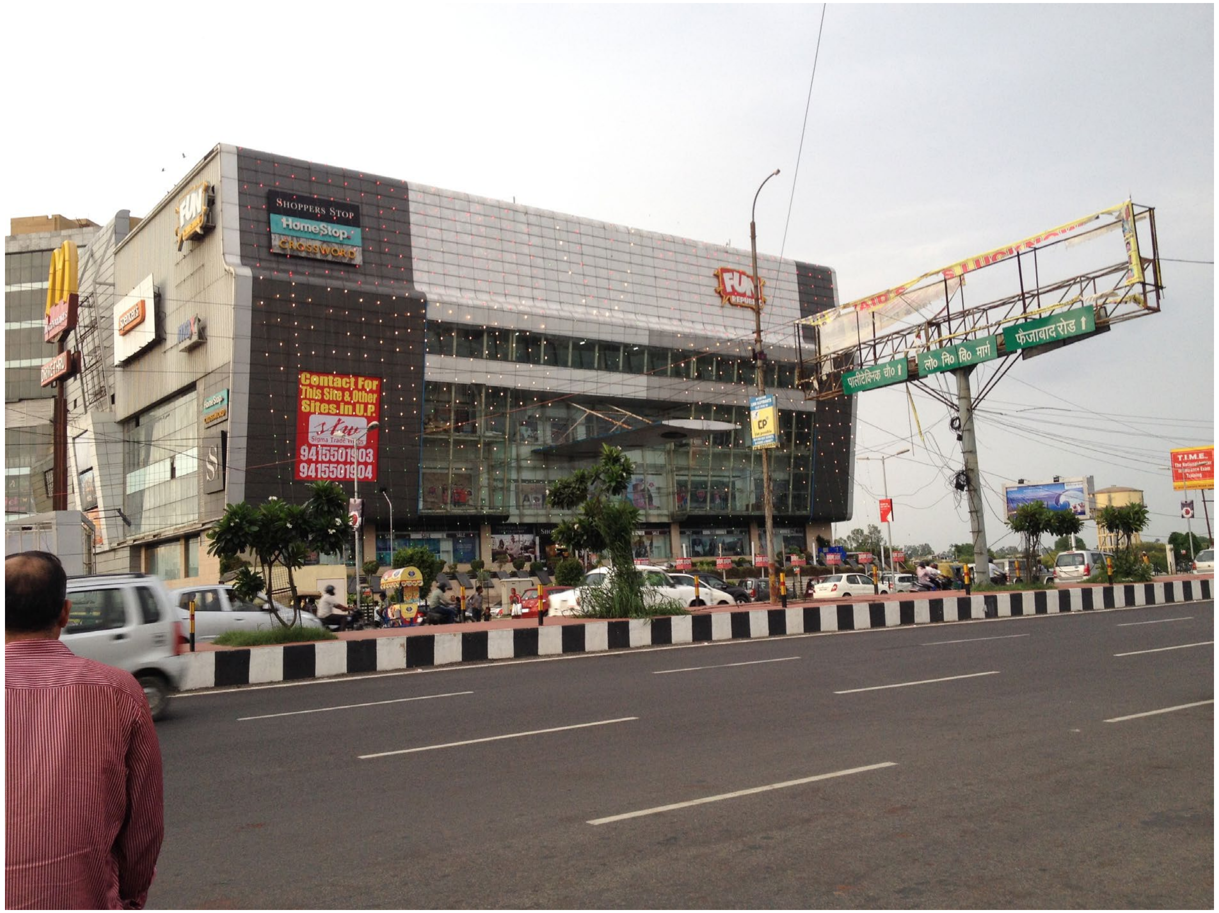


Photo from Lucknow, India, 2014

Terminology

- I follow Meletis & Dürscheid (2022):
- *Grapheme:* the smallest unit of a writing system.
  - For alphabets, equivalent to a letter
- A *script* is the set of graphemes used for a language
- *Orthography*: The prescriptive or descriptive rules which govern how graphemes combine to form words
- W*riting system*: a combination of script and orthography
- <a>: the grapheme “a”

How does a community select a writing system?

- Meletis (2018): four major factors determine which writing system a language will adopt:
  - *Linguistic fit*: Does each sound have a unique orthographic representation? Does each grapheme represent a single sound?
  - *Psychological/Cognitive fit*: How easy is the writing system for readers to process?
  - *Sociocultural fit*: How well does a writing system match users' identities? Do they wish to associate themselves with or distance themselves from users of particular scripts
  - *Technological fit*: how easily is the writing system used on computers and mobile devices?

Some factors which could affect orthographic conventions

- Avoiding ambiguity (*linguistic fit*)
- Similarity to English orthography to increase ease of learning (*psychological fit*)
- Similarity to Hindi and Urdu orthographies (*psychological/sociocultural fit*)
- Avoiding diacritics and complex letter combinations (*technological/psychological fit*)
- Expressing identity as a Hindi/Urdu speaker (*sociocultural fit*)
- Reflecting phonological variation (*sociocultural fit*)

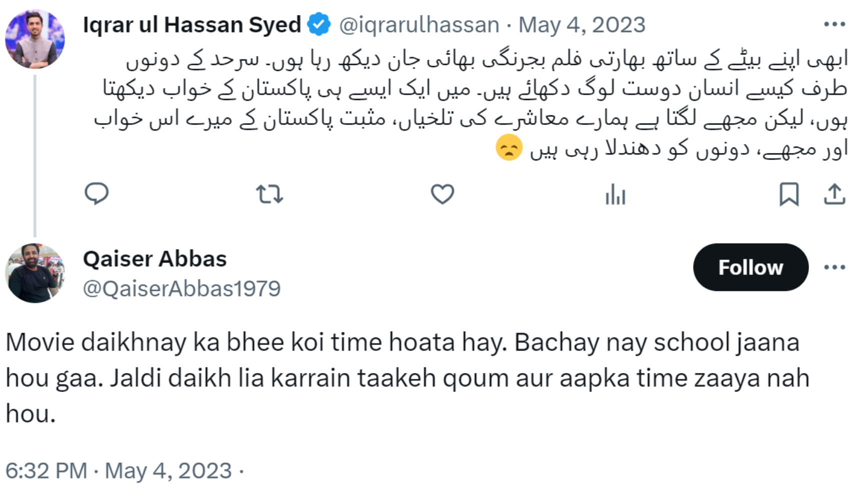
Research questions

- How is each phoneme represented in Roman Hindi-Urdu?
- How do linguistic fit, psychological/cognitive fit, sociocultural fit, and technological fit seem to shape these orthographic conventions?
- What does this data tell us about Hindi-Urdu speakers perceptions of sounds?
- Does the data reflect phonological variation?

Methods

- Data from X collected between May 1 and May 9, 2023:
  - Selected ASCII tweets that were automatically classified as Urdu or Hindi
  - Eliminated duplicates resulting from retweets/quote tweets
  - Resulted in 8909 usable tweets
- Composed a dataset of each word in the data
  - Removed proper names, obvious English loanwords, non-Hindi-Urdu words, web addresses, and X usernames
  - Ignored case
- For most of the analysis, used the top 2000 most frequent words only
  - At least six occurrences

Example tweets from my data



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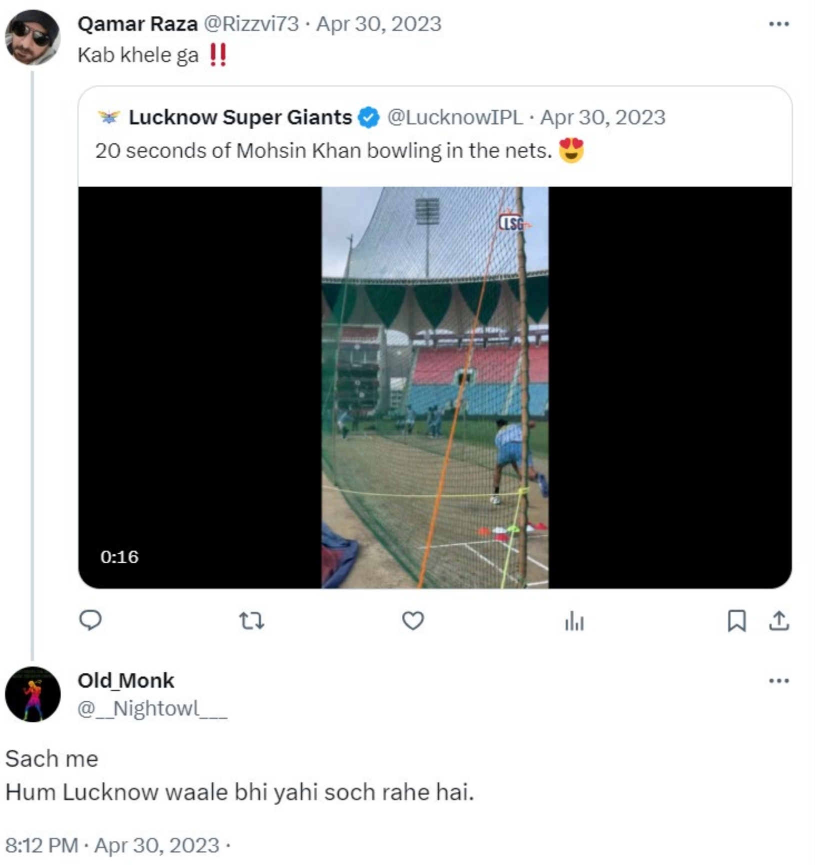

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Analysis

- Case 1 (stops): Reducing ambiguity
- Case 2 (velar fricatives): Is dialectal variation reflected in the orthography?
- Case 3 (/v/): What happens when there are two equally-plausible Roman-script equivalents?
- Case 4 (vowel tenseness/length): What can we learn about speakers' auditory perception of phonemes?

Stops

- Four-way stop contrast, plus phonemic geminate consonants
- Stop/affricate equivalents to all of the English places of articulation, plus retroflex stops
- How do we represent all of these using the Roman script!?

	Bilabial	Labio-dental	Dental	Alveolar	Retroflex	Palatal	Velar	Uvular	Glottal
Stops	**p pʰ b bʱ**		**t̪ t̪ʰ d̪ d̪ʱ**		**ʈ ʈʰ ɖ ɖʱ**		**k kʰ g gʱ**	**q**[1]	

Stops: observations

- When straightforward Roman script analogues are available, they are typically used
  - /p t̪ k t͡ʃ b d̪ g d͡ʒ/ -> <p t k ch b d g j>
- Retroflex and dental stops both represented with <t d>
  - But the rarity of retroflex stops probably makes these easier to process

Phoneme	/t̪/	/d̪/	/ʈ/	/ɖ/
Occurrences	1,052	773	364	155

Occurrences of dental and retroflex stops, including rejected English loanwords

Aspirate/Geminate stops

- /h/ as an aspiration/breathiness marker
  - <th ph kh bh dh gh>
- Consonant repeated to indicate gemination
  - <pp tt kk bb dd gg>

Velar fricatives

- /x/ and /ɣ/ are generally represented with <kh> and <gh>
  - Overlap with /kʰ/ and /gʱ/
  - Likely from early literature; used diacritics to distinguish
- Variation in representing /x/ and /ɣ/ may reflect phonological variation
  - /x ~ kʰ / but /ɣ ~ g/

	/ɣ/	/g/	/x/	/k/
<g>	100	3326	0	0
<k>	0	0	0	15558

Frequency counts by phoneme represented by <g> and <k>

/v/: Examining linguistic fit

- Allophonic variation between [v] and [w]
- In perceptual studies, native Hindi speakers could not reliably distinguish [v] and [w] (Grover, 2016).
- Preference for <w> therefore seems arbitrary
- Evidence for tendency towards higher linguistic fit

Expected surface form	<v>	<w>
[v]	276	1217
Free variation	46	107

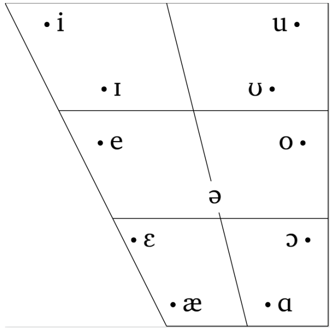
Orthographic representations of /v/ by phonological enviroment

Vowels tenseness/length: examining auditory perception

- All Hindi-Urdu vowels are common across English dialects
  - Length or tenseness contrast for high- and mid-vowels
- Lots of variation in literature (repeated representations in red)

	ɑ	e	ɛ	ɪ	i	u	ʊ	o	ɔ	ə
Gilchrist (1803)	<a>	<e>	<e>	<i>	<ee>	<oo>	<oo>	<o>	<uo>	<u>
Rahman (1923)	<ā>	<ē>	<e>	<i>	<ī>	<ū>	<u>	<o>	<au>	<a>
Sharma (1937)	<ā>	<e>/<ai>	<e>	<i>	<ī>	<ū>	<u>	<o>	<au>	<a>
Khan (2000)	<a>	<e>	<E>	<I>	<i>	<u>	<U>	<o>	<O>	<A>

- So, do users prioritize linguistic fit or convenience/ ease of use?
- A system like Gilchrist's (1803) might maximize both



An eleven vowel phonemic inventory of Hindi-Urdu (Ohala, 1994)

Analysis: Vowels

	<i>	<ai>	<e>	<ee>
/ɪ/	**1246**	0	2	0
/i/	**2244**	9	44	342
/ɛ/	0	**806**	163	0
/e/	14	1320	**13570**	6

Orthographic representations of front vowels

	<o>	<u>	<au>	<oo>
/ʊ/	0	**3026**	0	0
/u/	52	**1368**	0	225
/o/	**6560**	0	0	31
/ɔ/	239	0	**927**	0

Orthographic representations of back high- and mid- vowels

Analysis: Vowels

- <u> generally represents both /ʊ/ and /u/; <i> generally represents both /i/ and /ɪ/
  - Thus, both linguistic fit and possible ease of learning are rejected in favor of increased ambiguity
- But <au> generally represents /ɔ/ and <ai> generally represents /ɛ/.
- Possible conclusions:
  - Users inherit a comfort with vowel ambiguity from English and/or Perso-Arabic
  - The tenseness/length contrast is more easily perceived for mid-vowels than high vowels

Discussion

- Users do maximize linguistic fit, but with the following considerations:
  - Ambiguity is more tolerable for rare phonemes (i.e. retroflex consonants)
  - Perception and dialect variation are often reflected (i.e. /g$^{\text{ɦ}}$/)
  - Longer orthographic representations for a single phoneme are generally not favored (i.e. /t͡ʃh t͡ʃː/)
  - Variation is more likely for phonemes with no clear English equivalent (i.e. retroflex stops)
  - Conventions from English and from early Roman Hindi-Urdu literature may also be carried over (i.e. /x ɣ/)

Possible next steps

- Sociocultural variation – does Roman Hindi-Urdu retain ways of distinguishing self-identified Hindi and Urdu speakers?
- Do users have perceptions about ‘proper’ ways to write Hindi-Urdu?
- Is Roman Hindi-Urdu popular among users?
- How does processing time for the Roman script compare with the Perso-Arabic and Devanagari scripts?

Conclusion

- Meletis’ (2018) framework reasonably explains what we see for Roman Hindi-Urdu
- Linguistic fit, familiar orthographic conventions, and users’ perception of phonemes all help to shape the orthographic conventions of Roman Hindi-Urdu
- Other organically developing writing systems may be shaped by similar factors

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