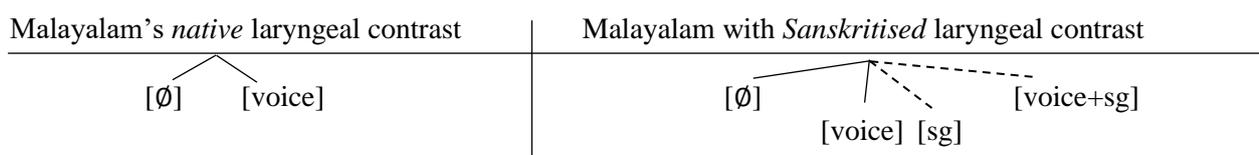
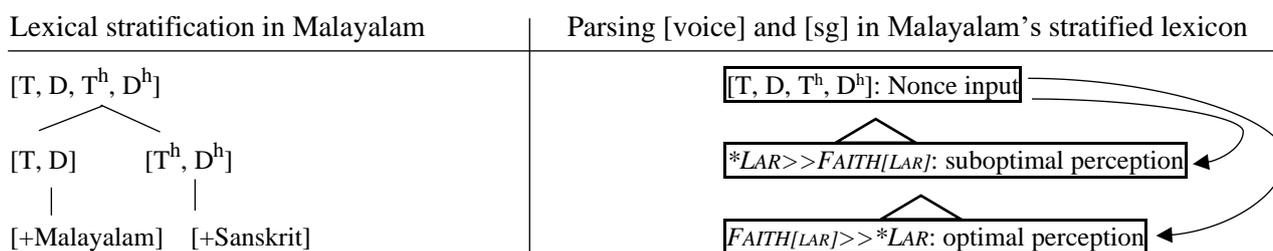


### Status of the Laryngeal Contrast in Malayalam: From Diachrony to Synchrony

Malayalam is a Dravidian language with large Tatsama vocabulary borrowed from Sanskrit, an Indo-Aryan (IA) language. Dravidian languages typically have only the voicing (T-D contrast) whereas most IA languages have voicing as well as aspiration contrast (T-D-T<sup>h</sup>-D<sup>h</sup> contrast) in the word initial position. Historically, due to language contact in various socio-economic domains, Sanskrit heavily influenced Malayalam's laryngeal repertoire (Nayar 1991 and Sridhar 1981). As a result, modern day Malayalam contains words with aspirated plosives whose cognates can be found in Sanskrit and other IA languages. However, the synchronic spoken Malayalam does not exhibit the same four-way contrast: voicing is allophonic intervocalically and post nasally, and aspiration is limited to a few social settings (Mohanan 1984, 2012 and Namboodiripad, 2021). Moreover, the native speakers stratify words with aspirated sounds as *non-native* [+Sanskrit] as opposed to the *native* [+Malayalam] lexical strata (Shridhar 2017, Mohanan 2012).



Because voicing was historically absent in Proto-Dravidian (Krishnamurti 2003), there is a possibility that even the voicing contrast isn't available in the Malayalam speaker's *native* lexical strata but exists only at the *non-native* strata. Assuming the native Malayalam speakers have not fully acquired the four-way contrast, while categorising them, do they parse it with their *native* (\*LAR>>FAITH[LAR]) or with *non-native* (FAITH[LAR]>>\*LAR) phonology? Models of perception and phonology (Best 1994, Boersma & Hamman 2009) predict that if they access the *non-native* strata, they will exhibit an optimal category perception and if they access the *native* strata, they will exhibit a suboptimal category perception.



This backdrop raises two important questions:

- 1) Synchronically, does the aspiration and voicing contrast exist in a Malayalam speaker's mind as it does in an IA language speaker's mind?
- 2) If not, then how does it differ from the IA laryngeal grammar?

**Hypotheses:** The theoretical arguments above lead us to three hypotheses for synchronic spoken Malayalam's laryngeal contrast:

- i) It contains neither voice nor aspiration contrast (nonce perception suboptimal for both voice and aspiration contrast).
- ii) It has voice-voiceless contrast only (perception of only aspiration contrast is suboptimal).
- iii) It has voice-voiceless contrast as well as aspirated-unaspirated contrast (optimal perception for voicing and aspiration contrast).

We conducted an experiment targeting category perception of the Hindi's 4-way laryngeal contrast in word initial position with two linguistic groups (Hindi (control) and Malayalam (target)) to test these hypotheses.

**Design:** we used two independent factors: "Laryngeal" with four levels (T, D, TH, DH) and "Place" with two levels (labial(L) and velar(V)), that yielded 8 conditions.

Total target items per participant: 8 conditions\*6 repetitions= 48 (+ 48 fillers)

Total data points per language: 48\*20 = 960

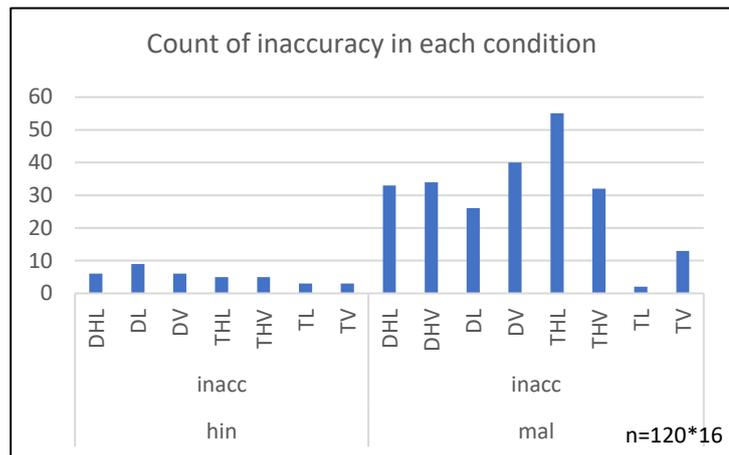
Total data points per condition: 960/8 = 120

**Items and participants:** Coronal and palatal sounds were eliminated from the design to avoid confounds from the inherent differences between Hindi and Malayalam for plosives. Two native Hindi speakers (one male and one female) produced these strings (with /-a:n/ template) embedded in a preverbal position three

times each, in a sound-treated room. The target strings were spliced keeping all phonetic cues as is and were pitch-normalized. There were 20 adult participants each in the control group Hindi (mean age 25.5; Hindi fluency: 91%) and in the target group Malayalam (mean age 21.9; Hindi fluency: 56%). Participants' fluency in Hindi was measured by averaging the scores of a sentence comprehension task and participant's self-reported rating.

**Method:** The participants were screened and made aware that they were going to perceive Hindi words. The items were presented through a forced choice task wherein an audio of the target sound was played, and four contrastive options were subsequently displayed on the screen as four buttons. The participant had to press the word s/he thinks was the most similar to the audio input heard. The experiment was conducted on the PCIBex PennController 2.0 (Zehr and Schwarz 2018) web-based interface, after running necessary pilots.

**Results:** The results strongly suggest that hypothesis (i) is correct for Malayalam's laryngeal contrast: speakers parse unfamiliar words with the *native* Malayalam's phonology that contains neither voicing nor aspiration contrast. Compared to the control group (Hindi), Malayalam group showed significantly higher inaccuracy on both voicing ( $p=0.0001$ ) and aspiration ( $p=1.35E-07$ ) perception. The unmarked T type conditions however were not perceived significantly differently with their Hindi counterpart ( $p=0.051$ ).



**Discussion:** The results show that the native Malayalam speakers are not as good as Hindi speakers at perceiving string initial voicing as well as aspiration contrast. There may be two possible reasons for it. First, Malayalam speakers lack voicing and aspiration contrast altogether and second, Malayalam speakers parse the nonce words from the default *native* Malayalam phonological strata (where \*LAR>>FAITH[LAR]) instead of the *non-native* Sanskrit strata (where FAITH[LAR]>>\*LAR). This inference is further enforced by the finding that both linguistic groups have similar perceptual scores for T-type conditions where laryngeal markedness constraints do not interact. Moreover, native speakers finding it very difficult to come up with voiced-voiceless and aspirated-nonaspirated minimal pairs indicates the non-nativity of these contrasts. More theory-backed experimental data is needed to extend this analysis from individual languages (Malayalam and Hindi) and specific context (string initial) to language families (Dravidian and IA). We are currently in the process of exploring these dimensions.

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