A Phonetic Investigation of the Retroflex Approximant in Tamil

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Objectives

Standard Tamil is commonly described to have five distinct liquid sounds, /l/, /ɭ/, /r/, /ɾ/, and /ɻ/. (McDonough Johnson, 1997).

- To what degree of audible distinction /ɻ/ produced by Native Tamil speakers?
- What acoustic signals may listeners be using to distinguish between /ɻ/ from other liquids?

Background

Tamil is a Dravidian Language spoken natively by approximately 78 million people, largely concentrated in South India, but also spread across South Asia, with diaspora communities all over the world. Tamil is used widely in spoken and written communication, and features a level of diglossia between spoken Tamil which tends to vary by region and socioeconomic factors, and a formal or 'literary' variety that tends to uphold standards set in the 13th century by Tamil grammarian Pavanandi (Keane, 2004).

- In Spoken Tamil, /ɻ/ and /ɭ/ are largely merged in many dialects in and around the capital city of Chennai, merging them to [l].
- This distinction is upheld in the native orthography, and by Tamil medium education.

Tamil	ல் ள் ழ் ற் ர்
IPA	l ɭ ɻ r ɾ
Romanization	l ll zh rr r

Figure 1: Map of Tamil speakers. Regions marked light and dark blue show where Tamil is spoken by a minority and by a majority, respectively. *"Idioma tamil", by Fobos92 shared under CC BY-SA 3.0*

Methods

Tokens containing each Tamil liquid were elicited from the seven speakers.

- Speakers were all native Tamil speakers, living in India.
- Thirteen words with liquid targets were elicited, and three words with no testing significance were elicited, with naturalistic carry sentences.
- Participants were told speak naturally and loudly, and speakers were not informed what particular sounds were being studied.
- Words were elicited by reading, and participants were asked to self-record.

Praat was used to analyze each liquid articulation, measuring formants 1 to 4, using Fourier analysis.

- Formants taken from representative moment of the articulation rather than averaging over the bounds, due to uneven recording quality.

Tokens

Tamil	IPA	Gloss	Target
வலி	ʋəli	'pain'	l
விலை	ʋiləi	'price'	l
புலி	puli	'tiger'	l
களி	kəɭi	'porridge'	ɭ
வெள்ளை	ʋeɭːəi	'white'	ɭ
புளி	puɭi	'tamarind'	ɭ
கறி	kəri	'curry'	r
புறா	pura	'dove'	r
கரி	kəɾi	'charcoal'	ɾ
வழி	ʋəɻi	'way'	ɻ
பழி	pəɻi	'blame'	ɻ
பழம்	pəɻəm	'fruit'	ɻ
விழா	ʋiɻa	'ceremony'	ɻ
கடி	kədi	'bite'	-
பக்கம்	pəkːəm	'page'	-
கத்தி	kətːi	'knife'	-

Important Result

As is described for English, rhotic approximants, here /ɻ/, distinguish from non-rhotic approximants due to a low F3. However, compared with English this is a relatively weak correlation.

Researcher Observations

Tokens were analyzed by the researcher (Native English speaker), and a correspondent (Native Tamil speaker).

- Distinction was very salient in some speakers, while others no salient distinction at all.

Speaker ID	DP	EB	KM	PP	PS	RM	VD
CT Native	-	+	+	+	+	-	+
TM Education	+	+	+	-	-	-	+
/ɻ/-/ɭ/ Distinction	+	+	-	-	+	-	+

- No speaker consistently produced an audible /ɻ/ speaking casually during the debrief phase.
- Some 'misproductions' were found, a token containing /ɻ/ was pronounced with an /ɭ/-seeming sound in an otherwise /ɻ/-/ɭ/ distinguishing speaker. Speakers not corrected.

Results

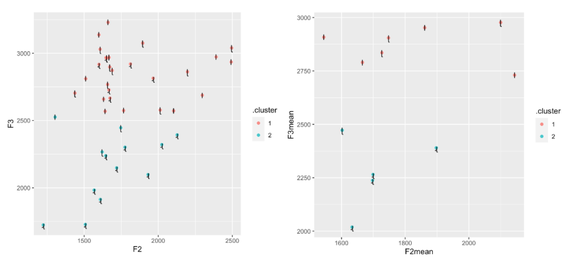

Figure 2: F2 and F3 of approximants for speakers with distinction. Clustered using k-means with 2 clusters.

- Weak correlation between low F3 and rhoticity.
- Clusters almost fully accurate in means data.

Discussion

In English, low F3 is associated with rhoticity, in essence, /ɹ/ and /l/ have similar F1 and F2, but /ɹ/ has significantly lower F3. A similar correlation was demonstrated in Tamil for speakers for whom an audible distinction persisted, but this correlation is far weaker. This may indicate:

- Speakers may use some other signal for discrimination of rhoticity. F1 and F2 were additionally checked, and no stable distinction was found.
- This distinction may be less strong or less important for these Tamil speakers.

Further Study

Due to the limitations of this study, there were certain conditions that may have affected the results. If repeated, it is hoped that a study would account for the following.

- All speakers were urban Tamil speakers, and as such no participant truly featured a strong distinction between these sounds in casual speech. The productions of /ɻ/ were implicitly coaxed from these speakers due to being under laboratory conditions.
- Due to remote self-recording, audio quality was not even between speakers.

References

1. Keane, E. (2004). Tamil. Journal of the International Phonetic Association, 34(1), 111-116. doi:10.1017/S0025100304001549
2. McDonough, J., & Johnson, K. (1997). Tamil liquids: An investigation into the basis of the contrast among five liquids in a dialect of Tamil. Journal of the International Phonetic Association, 27(1-2), 1-26. doi:10.1017/S0025100300005387

Acknowledgements

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