Title: Two types of pre-stopping in Kaytetye
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1. Introduction

Kaytetye is an Arandic language of central Australia. Existing materials on Kaytetye report pre-stopping only in nasals. In this study, we present evidence that Kaytetye laterals also commonly have pre-stopped realizations. Kaytetye is one of the few Australian languages in which nasal prestopping is phonemically contrastive: e.g. an-ŋa ‘sit-PAST’ vs. aŋ-ŋa ‘stand-PAST’. Plain and pre-stopped lateral realizations do not contrast, which is the usual situation for pre-stopping of both laterals and nasals in Australia (Butcher 2006, Dixon 2002:597).

The difference in the phonological status of pre-stopping between nasals and laterals means that any overall analysis of pre-stopping in Kaytetye must be grounded in phonetic and not phonological considerations. Existing analyses of nasal pre-stopping relate it to duration. They suggest that pre-stopping developed historically from allophonically longer nasal realizations (see Round (2011) for a summary). The extension of this analysis to laterals predicts that pre-stopping in laterals should also correlate with length. Specifically, non-contrastive pre-stopped lateral realizations should be significantly longer than plain lateral realizations.

2. Methodology

In this study, we collected audio data from seven Kaytetye speaking residents of Stirling and Neutral Junction, NT. The speakers participated in an elicited imitation task where they were presented with an image and pre-recorded audio of the targeted word in a carrier phrase and asked to repeat the utterance. The target words contained the coronal stops /t, ʈ, c/, nasals /n, ɳ, p/, pre-stopped nasals/ŋn, ŋp, ŋŋ, and laterals /l, ɭ, ʎ/, preceded by word-initial /a/ and followed by /a/ or /ə/. Audio recordings were made in a quiet room, and were later digitized. We examined the waveforms in Praat (Boersma and Weenink 2012), marking the onset and offset of each target segment, as well as the onset and offset of any visible closure. Segment and closure durations were then automatically extracted, and results were based on analysis of these data.

3. Results

As shown in Figure 1, very few target nasal consonants (2.4%) were realized with any closure, whereas target pre-stopped nasals and oral stops almost always were (95.6% and 99.8% respectively).

![Figure 1. Proportion of realizations with closure, by consonant manner.](image1)

![Figure 2. Mean total duration of segments, by manner and presence of closure.](image2)
Notably, however, where variability exists, the apical nasals and pre-stopped nasals were consistently more likely to be produced with closure. Additionally, in keeping with diachronic explanations for the development of pre-stopped nasals, the pre-stopped nasal realizations were significantly longer than plain nasal realizations (general linear model, Tukey multiple comparisons; $\beta=70.22$, $z=16.79$, $p<0.0001$), as shown in Figure 2.

On the other hand, 46.9% of all lateral productions demonstrated measurable closure duration (Figure 1). However, in contrast with nasals, pre-stopped realizations of laterals were not significantly longer than plain realizations (linear mixed model, with Participant as random factor; $\beta=8.20$, $t=1.65$, $p=0.0994$). Figure 1 also demonstrates that, whereas the appearance of pre-stopping in nasals and pre-stopped nasals is essentially constant with minimal variation, in laterals it is highly variable between speakers and shows no correlation with any of the coronal places of articulation. Furthermore, as shown in Figure 3, the duration of closure in realizations of laterals was significantly shorter than the duration of closure in pre-stopped nasals (general linear model, Tukey multiple comparisons; $\beta=54.92$, $z=13.22$, $p<0.0001$).

4. Conclusions

We have shown that lateral pre-stopping and nasal pre-stopping are quite distinct synchronically in Kaytetye. Nasal pre-stopping is phonemically contrastive and shows minimal variation. Further, the minimal variation that does exist correlates with apical place. In addition, pre-stopped nasal realizations are significantly longer than plain nasal realizations (Figure 2). In contrast, lateral pre-stopping is non-contrastive and shows considerable variation that does not correlate with either place or speaker. Pre-stopping in laterals is also significantly shorter than pre-stopping in nasals.

Finally, pre-stopped lateral realizations are not significantly longer than plain lateral realizations. This lack of correlation between length and pre-stopping for laterals suggests that the diachronic hypothesis relating contrastive pre-stopping to length in nasals cannot be applied to laterals. As such, there are two diachronic scenarios. Either pre-stopping in laterals has a distinct origin to that in nasals, or new hypotheses are required on the genesis of pre-stopping in general. Further research is required to determine which of these options may be supported.

References

Version 5.3.35, retrieved 8 August 2012 from http://www.praat.org/

