Central vowels in Arrernte: metrical prominence and pitch accent

Marija Tabain [1], *Kristine Rickard*[1], *Gavan Breen* [2], *Veronica Dobson* [2]

[1] Linguistics Program, La Trobe University, Melbourne, Australia.
[2] Institute for Aboriginal Development, Alice Springs, Australia
m.tabain@latrobe.edu.au

Abstract

This paper presents duration and formant data for the central vowels /@/ (schwa) and /a/ in Arrernte, a central Australian language. Results show that /@/ has a shorter duration and higher position in the vowel space in metrically prominent syllables, whereas /a/ has a longer duration and no change in formant structure. By contrast, effects of pitch accent are minimal for both vowels.

Index Terms: prosodic structure, Australian languages, vowels.

1. Introduction

The focus of this paper is on prosodic variation in the central vowels of Arrernte /a/ and /@/. In particular, the following two prosodic conditions are examined in a passage of read speech: (1) metrical prominence and (2) the presence of an intonational pitch accent. The metrically prominent syllable in Arrernte is the second VC syllable in the word (however, the realization of a word-initial schwa is optional [1]). In the figure and table below, metrically prominent vowels are marked with an asterisk (*); pitch-accented vowels are labeled "P" and non-pitch-accented vowels are labeled "N".

2. Method

The read text for this study was the Arrernte version of "The North Wind and the Sun", as used in [2]. The speaker was female.

The recorded passage was labeled segmentally and intonationally by the second author using the speech tool EMU. All data analysis was carried out using the R statistical package (http://www.R-project.org) interfaced with EMU (http://emu.sourceforge.net).

3. Results

T-tests showed significant differences in duration for both vowels according to metrical prominence, but no significant difference according to the presence of a pitch accent. Note, however, that a metrically prominent schwa is shorter than a non-prominent schwa, whereas the reverse is true for /a/. Formant analyses showed that /@/ is significantly higher when metrically prominent, and significantly more back when pitch-accented. There were no effects on vowel formants for /a/ (see Table 1 and Figure 1).

4. Discussion

Despite a significant difference in duration for the metrically prominent /a/, there was no difference in formant structure for this vowel. It is also notable that the presence of a pitch accent had no effect on duration for either /@/ or /a/.

Interestingly, the duration of /@/ was shorter under metrical prominence rather than longer. It is hypothesized that this is compensated for by a greater duration in adjacent consonants, which are particularly complex in Australian languages. The higher position of /@/ in the vowel space in the metrically prominent condition also suggests a rapprochement to the consonant. Further work will elucidate the question of how /@/ behaves differently to /a/ in Arrernte.

Table 1. *Duration results for each vowel in each prosodic context.*

Metrical Prom.	**/@/**	**/@/***	**/a/**	**/a/***
N.	83	48	35	9
Mean (m.s.)	130	85	120	151
S.D. (m.s.)	92	30	28	37
Pitch Accent	**/@/ P**	**/@/ N**	**/a/ P**	**/a/ N**
N.	27	104	18	26
Mean (m.s.)	96	119	128	126
S.D. (m.s.)	52	84	34	32

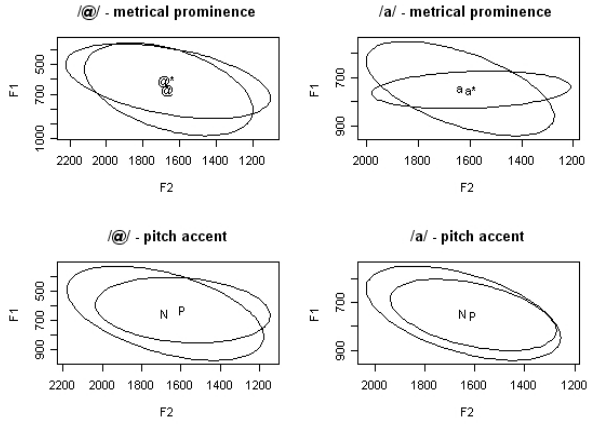

Figure 1: Vowel formants for schwa (= /@/ left column) and /a/ (right column).

5. Acknowledgements

This work was supported by the Australian Research Council.

6. References

[1] Henderson, J. Topics in Eastern and Central Arrernte Grammar. PhD thesis, University of Western Australia, 1998.
[2] Breen, G. & Dobson, V. "Central Arrernte", JIPA, 35, 249-254, 2005.

Copyright © 2008 ISCA