

BURMESE QUOTATION INTONATION*

Mimi Tian^a, Albert Lee^b

^aUniversity of Mainz, ^bThe Education University of Hong Kong

tianmimi@connect.hku.hk, albertlee@eduhk.hk

ABSTRACT

Burmese is a complex tone language with five lexical tones showing multi-dimensional phonetic distinctions in pitch, duration, and phonation. It also has rich intonation phenomena on the sentence level. A salient quotation intonation commonly occurs on the last syllable of a quoted sentence. This paper presents a production experiment investigating the interaction of quotation intonation with different lexical tones in Burmese. The results showed that the F0 contrasts between different lexical tones were enhanced in the quotation context and the duration difference was partially neutralized in quotations. This phenomenon is distinct from replacive tonal alternation ([14]) and from the realisation of focus in Burmese ([11]). Our findings demonstrate how different dimensions of prosody, viz. F0 height, F0 contour and duration, depart from their default settings in a lexical tone and change independently in opposite directions for the sentence-level function.

Keywords: Burmese, tone, intonation, quotation

1. INTRODUCTION

This paper reports on a semantically significant sentence intonation that marks quotation in Burmese. In the following example (1a), the Low tone particle *tè* occurs in sentence final position and has its usual low rising contour. In (1b), the same sentence appears before a quotation marker; *tè* as the last syllable of the quoted sentence then has a rather different realization from *tè* in (1a). This paper catches this hearing impression and provides an initial survey of the realization of distinct lexical tones in the context of quotation in Burmese. The results of the study aim at adding new insights to the emerging and intriguing area of sentence intonation in complex tone languages. The target syllable in quotation context is rendered bold in this paper to indicate its special form.

(1) a. *ná.lè-tè*
understand-REAL
(I) understood.

b. *ná.lè-tè* *lɔ* *pjò-tè*
understand-REAL QUOT speak-REAL
(He) said (he) understood

Modern standard Burmese has a complex tone system with five lexical tones: Low, High, Creaky, Checked and Neutral. Every syllable in Burmese is lexically specified for one of these five tones. These tones show multi-dimensional phonetic distinctions in pitch, phonation, duration, intensity, and vowel quality, and have different manifestations in phrase-medial and phrase-final positions (c.f. [8, 2, 13, 4, 5]). The table below summarises the phonetic properties of Burmese lexical tones in citation form.

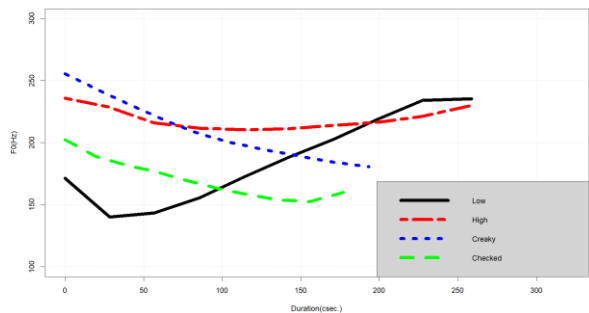
tone	pitch	contour	phonation	intensity	duration
Creaky á	very high	sharp fall	creaky	high	less long
Low à	low	early fall	breathy	low	fairly long
High á	fairly high	late fall	breathy	high	very long
Checked a?	very high	sharp fall	creaky	high	short
Neutral ə	variable	level	normal	low	very short

Table 1: Phonetic properties of Burmese lexical tones

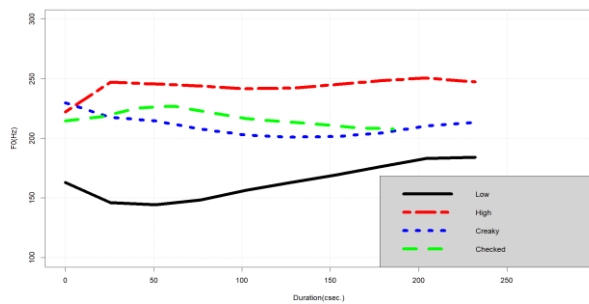
Burmese exhibits rich phenomena of sentence-level tonal alternation. For instance, the ‘Induced Creaky Tone’ replaces High or Low tone in certain contexts, the possessor marking function of it is analysed as a tonal particle in [14]; an experiment on the realization of focus on Low tone elements in Burmese ([11]) showed that a Low tone object constituent in focus has a higher F0 and longer duration.

The quotation intonation is another phenomenon where sentence intonation interacts with lexical tones in Burmese. Example (2) further demonstrates the nature of this intonation. The form *lɔ* in (1b) is a quotation marker but the same form in (2a) means “because”, hence only the syllable immediately before the quotation *lɔ* in (1b) acquires the special intonation. In addition, there is another quotation marker *tɛ* as in (2b), where the syllable immediately before this particle also shows quotation intonation, as in the audio records accompanying Tang & Ne Win’s [12] Burmese textbook. The quotation particles can even be omitted, leaving the intonation alone to mark quotation. Therefore, we are discussing

immediately before the quotation particle (1b). We can see that both the F0 contours and durations look rather different in (1a) and in (1b). Intuitively, the shape of the lines becomes similar while the distance between the lines is larger in the context of quotation. The next subsections disentangle the different dimensions and present the results of statistical tests on F0 and duration respectively.



(1a) Mean F0 and duration of $t\acute{e}$, $t\acute{e}$, $t\acute{e}$, $t\acute{e}$ in sentence final position



(1b) Mean F0 and duration of $t\acute{e}$, $t\acute{e}$, $t\acute{e}$, $t\acute{e}$ in quotation final position

Figure 1: Comparing mean F0 and duration of the syllable $t\acute{e}$ in different contexts

3.2 F0

In Figures (2-5), the blue ribbon represents a tone in sentence final position and the pink ribbon represents the tone in quotation final position.

Figure 2 compares the realisation of Low tone syllables in sentence final and in quotation final positions. It has the usual low-rising F0 contour in sentence final position, and the F0 is even lower in quotation final position. As the two contours overlap in the SS ANOVA plot, the F0 difference is not significant.

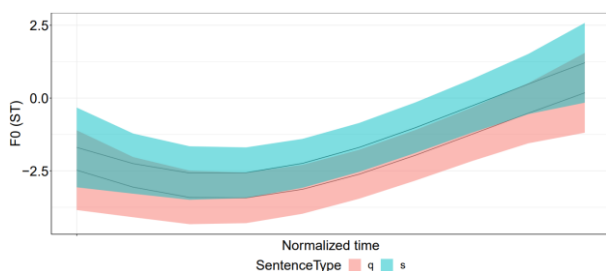


Figure 2: SS ANOVA plot comparing Low tone in sentence final and quotation final positions.

Figure 3 shows the realization of High tone in different environments. High tone has a gentle falling contour in the sentence final position, and it has a slight rising contour in quotation final position. This difference is not significant in the SS ANOVA test either.



Figure 3: SS ANOVA plot comparing High tone in sentence final and quotation final positions.

The Creaky tone has a sharp falling contour both in sentence final and in quotation final position. There are a few individual cases where a Creaky tone syllable is produced with a rising contour in quotation final position, but these cases are not reflected in Figure 4. In Figure 4, the F0 is even higher in quotation final position than in sentence final position, and this difference is significant.

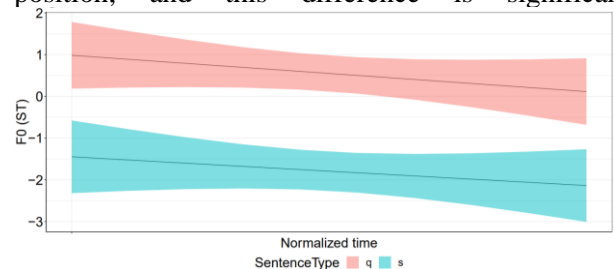


Figure 4: SS ANOVA plot comparing Creaky tone in sentence final and quotation final positions

Similar to Creaky tone, Checked tone also has a sharp fall in sentence final position. In quotation final contexts, this fall is kept in some individual cases, but is changed into a high rising contour in most cases. The overall trend is a significantly raised F0 in quotation final position as shown in Figure 5.

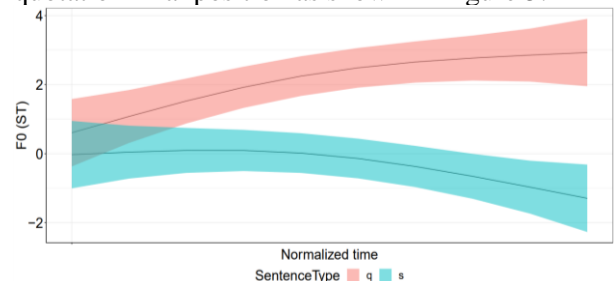


Figure 5: SS ANOVA plot comparing Checked tone in sentence final and quotation final positions.

The following Figures 6 and 7 summarise the shape of the four tones in sentence final and quotation final positions. It is quite clear that the distance between the tones is wider in quotation final position than in sentence final position, and the falling contour of High, Creaky and Checked tones is either not as

steep as in sentence final position or altered to a rising contour in quotations.

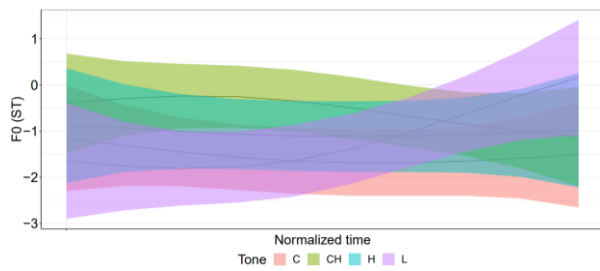


Figure 6: Four tones in sentence final position

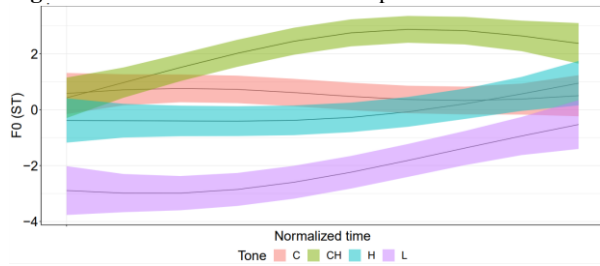


Figure 7: Four tones in quotation final position

3.3. Duration

Figure 8 shows the duration differences. In quotations, Low tone and High tones are shorter on average, while Creaky and Checked tones syllables were longer. Independent samples t-tests revealed that the difference in duration between Quotation and Statement was highly significant for Creaky tone ($t(47.75) = 4.44, p < .001$), and marginally significant for Checked tone ($t(49.86) = 1.61, p = .113$).

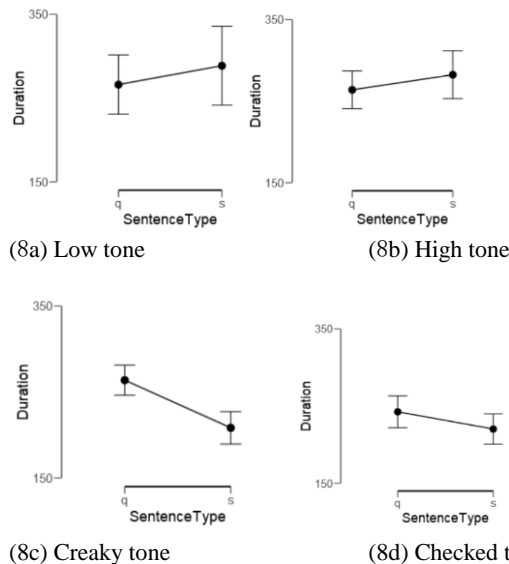


Figure 8: Duration of the four tones in sentence final and in quotation final positions

4. DISCUSSION

4.1. Main findings

First, the last syllable in quotation was not always lengthened. The duration difference between the syllable in sentence final and quotation final position was not significant except for Creaky and Checked tones. As the two shorter tones were lengthened, the duration contrast between the tones was reduced in quotation contexts.

Second, F0 was not always higher on the last syllable of quotations. High, Creaky and Checked tones were higher in quotations, while Low tone syllables were even lower in quotations. The overall F0 contrast between different lexical tones was maintained and even enhanced instead of neutralized. Meanwhile, the falling High and Checked tones acquired a rising contour in quotations.

Third, as the F0 of Low tone was not higher in quotations, its form was different from the realization of Low tone under focus, which is raised in the description of focus in [11].

These results provide us with an overview of how Burmese marks the quotation function by means of prosody while maintaining the identities of the lexical tones. Although Table 1 introduces a complex package of features for each lexical tone, we saw in this study that different dimensions can change independently in opposite directions on the sentence level: to compensate for the more similar F0 contour and duration properties, the overall F0 height contrast of the tones was enhanced in quotations.

4.2. Limitations and suggestions for future research

As an initial survey of a new phenomenon, this study sacrifices depth and detail of individual cases for a broad general overview of the phenomena. Some of the subcases in this study, for instance, the realization of certain sentence final particles in different contexts, might provide interesting topics for further research.

Further measurements on the existing data can be conducted, for example, the phonation difference of the target syllables in different contexts and the realizations of the preceding syllables in these contexts.

Future experiments could be conducted with two speakers in the same experiment session, in which one reports the speech of the other, to imitate the utterance of quotation in natural context. Further perception tasks can also be conducted to explain our hearing impression and its correlates in the complex manifestation of sentence intonation.

7. REFERENCES

- [1] Boersma, Paul & Weenink, David (2018). Praat: doing phonetics by computer [Computer program]. Version 6.0.43, retrieved 8 September 2018 from <http://www.praat.org/>
- [2] Bradley, D. 1982. Register in Burmese. In Bradley, D. (ed.), *Tonation* (Pacific Linguistics Series A-62), 117-132. Canberra: Australian National University.
- [3] Davidson, L. S. 2006. Comparing tongue shapes from ultrasound imaging using smoothing spline analysis of variance. *J. Acoust. Soc. Am.*, vol. 120, no. 1, 407–415.
- [4] Green, A. D. 2005. Word, foot and syllable structure in Burmese. In: *studies in Burmese Linguistics*, ed. J. Watkins, 1-25. Canberra: Pacific Linguistics.
- [5] Gruber, J. F. 2011. *An articulatory, acoustic, and auditory study of Burmese tone*. Doctoral Dissertation of Georgetown University. UMI No.: 3491023.
- [6] Gu, C. 2014. Smoothing spline ANOVA models: R package gss. *J. Stat. Softw.*, vol. 58, no. 5, 1–25.
- [7] Henderson, E. J. A. 1967. Grammar and Tone in South East Asian Languages. *Wissenschaftliche Zeitschrift der Karl-Marx-Universität Leipzig* 16:171-8.
- [8] Hutchinson, J., and C. McClenon. 1977. An acoustical study of the vowels and tones of Burmese. *Texas Linguistic Forum* 8: 129–142.
- [9] Jenny, M. & San San Hnin Tun. 2016. *Burmese: A Comprehensive Grammar*. Abingdon and New York: Routledge.
- [10] Okell, J., and Allott A. 2001. *Burmese/Myanmar dictionary of grammatical forms*. Richmond: Curzon.
- [11] Simpson, A., & Watkins, J. (2005). Constituent focus in Burmese: A phonetic and perceptual study. In: Watkins J. (ed.) *Studies in Burmese Linguistics*, 27-66.
- [12] Tang, X. and Ne Win. 2009. *Chuji miandianyu huihua jiaocheng (A beginner's textbook of Burmese conversations)*. Beijing: Shijie Tushu.
- [13] Thein Tun. 1982. Some acoustic properties of tones in Burmese. In Bradley, David (ed.). *Papers in South-East Asian linguistics No. 8: Tonation* (Pacific Linguistics, Series A-62) 77–116. Canberra: Australian National University.
- [14] Tian, M. 2018. Anatomy of a grammatical tone: the case of “Induced Creaky Tone” in Burmese. *Linguistics of the Tibeto-Burman Area* 41:2.
- [15] Wheatley, J. K. 1987. “Burmese”. In: Comrie, Bernard (Ed.). *The major languages of East and South-east Asia*. London: Routledge. 106-126.
- [16] Xu, Y. 2013. ProsodyPro: A tool for large-scale systematic prosody analysis, in *Proceedings of Tools and Resources for the Analysis of Speech Prosody (TRASP 2013)*, 7–10.

* The recordings were taken in the audio recording room at the University of Hong Kong. We are grateful to Umberto Ansaldo and Diana Archangeli for their help and advice.