

# The Duration Statistical Analysis of Tibetan Motto

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**Keywords:** poem; Tibetan; duration; pause

**Abstract.** This paper focuses its study on the collection of poems Sajia Motto for Tibetan and adopts the research methods of experimental phonetics to analyze the duration distributions of sentence, text, and pause between sentences. The study finds that the sentence duration of female is longer than male, and the time-domain of female is also bigger than male, and the pause duration of male and female are the same, the longest pause duration of each poem is between the second and third sentence. On the whole, the rhythm of poetry reading has a certain mode, but different speaker has a little difference with each other in time-domain of single sentence. The results of this paper provide basis data for the prosody modeling of Tibetan poetry reading.

## 1. Introduction

Motto poem, called le harmonic in Tibetan which means kind words, is mainly to promote the philosophy of mans' ways of handling affairs. Writing on folk song style, four lines a paragraph, seven characters a line, two sentences for metaphor, and two sentences refers to affair [1]. Sajia Motto is the most famous Tibetan Motto poem, wrote by Sakya Pandita who is a famous scholar and social activist in Tibetan history, contains nine parts: identify scholar, identify eminent master, identify fool, identify distinguished men, identify evil, identify intrinsic quality, identify absurd, identify enterprise and identify Buddha dharma. Extensive use of vivid metaphor to make each poem not only has metaphor, but has existence, and improve the vividness of philosophical realistic parts [2]. Using the method of experimental phonetics to do an elementary research of Tibetan poem, such as: using respiratory zone to research the rhythmic of Tsangyang Gyatso love song, to establish the linear breathing model [3].

## 2. Research method

In this paper, two Tibetan speaker from Lasa with preferable broadcast treatment and pure pronunciation, choose 40 verses in Sajia Motto for recording. The main hardware equipment for signal collection are: laptop, external sound card, sound console and neck-style microphone. Recording software are Audition and Chart7. Firstly, collect voice, sound, and respiratory zone signal by Chart7. Secondly, use Audition to edit the voice signal from the first channel. Finally, mark each segment of the edited voice file. Figure 1 is the tag result of two motto verses.

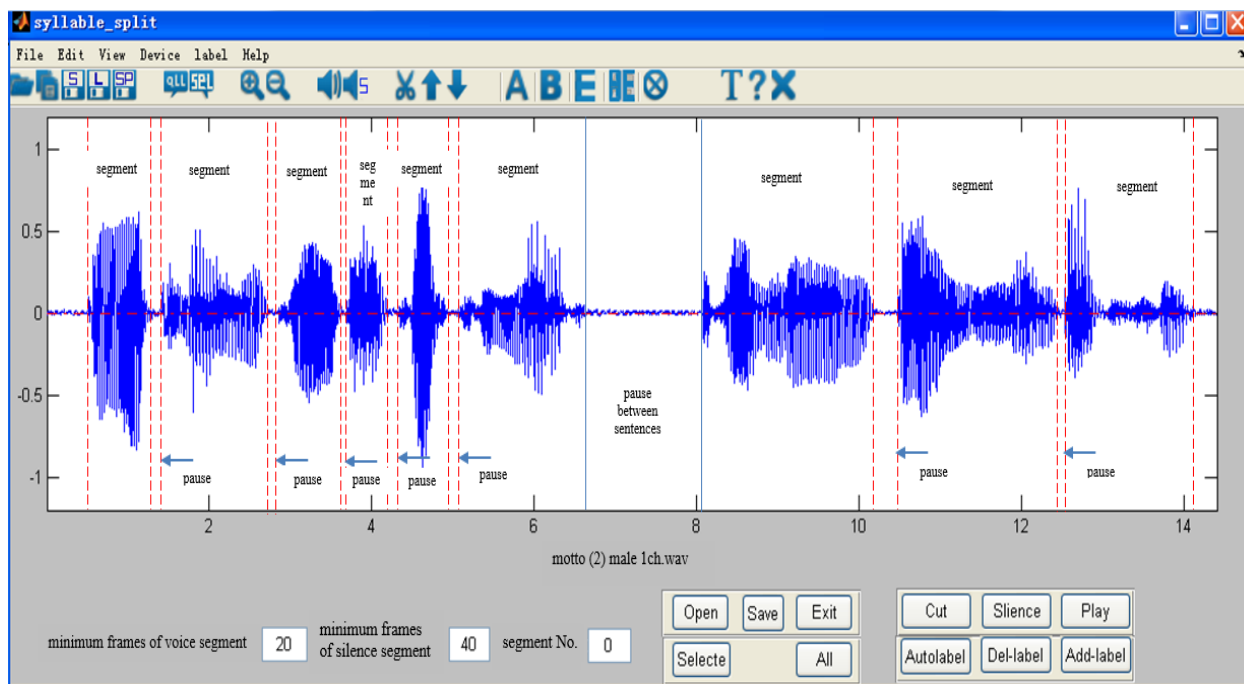


Figure 1 Tag of voice segment and pause

### 3. Segment duration analysis

#### 3.1 Total duration of the text

To calculate the total reading duration in unit of the entire poem without pause duration. The shortest duration of male is 5.69 second, the longest is 6.59 second, and average duration is 6.12 second. The shortest duration of female is 6.33 second, the longest is 8.16 second, and average duration is 7.24 second. Frequency distribution as shown in Figure 2 and Figure 3. The total duration distribution of female is more concentrated and stable.

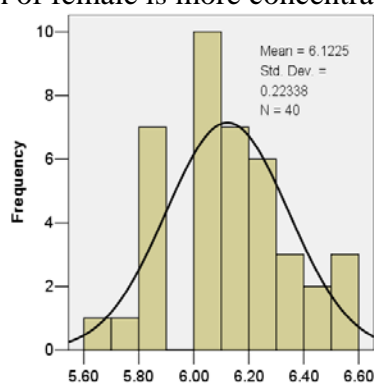


Figure 2 Frequency distribution of male

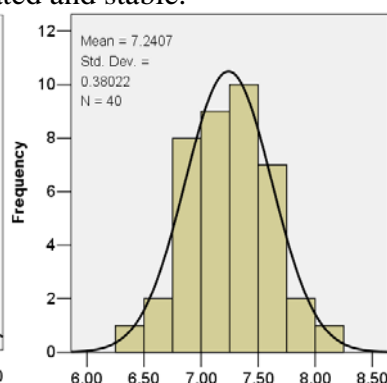


Figure 3 Frequency distribution of female

#### 3.2 Sentence duration analysis

Although each motto poem consists of four sentences, and each sentence is made up of seven syllables, to reflect the reading emotion and the rhythm of rising and falling tones, the sentence acoustics parameters are different at different position. This is reflected in pitch variation, energy change and duration change. The focus of this analysis is on duration change. To divide the four sentences into four groups in unit of the sentence duration: the first sentence, the second sentence, the third sentence and the fourth sentence. Each group has 40 duration data. To calculate the maximum, minimum and average value of each group for duration horizon of sentences in different position. Figure 4 and Figure 5 show the sentence duration range of male and female in different position, respectively.

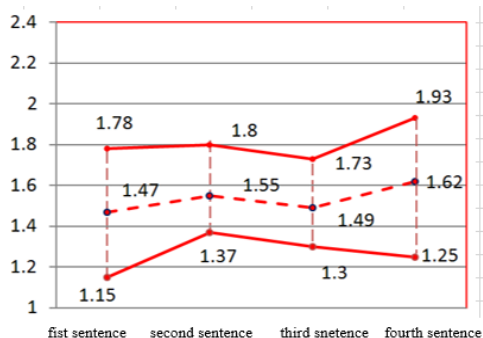


Figure 4 Sentence duration range of male

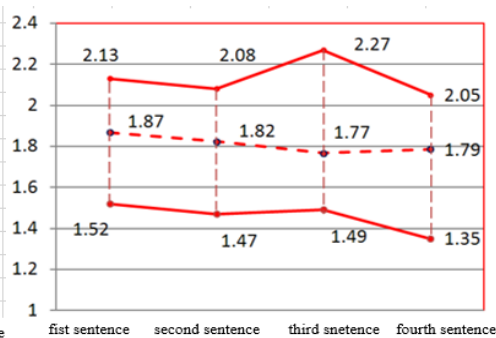


Figure 5 Sentence duration range of female

From Figure 4 and Figure 5, on the whole, the duration range of male is between 1.2 and 1.9 second, and female is between 1.4 and 2.2 second. The average duration of male in different position is smaller than female. The variation range of male are: 0.63 second, 0.43 second, 0.43 second and 0.68 second. The variation range of female are: 0.61 second, 0.61 second, 0.78 second and 0.7 second. The variation range of male in the first sentence and the fourth sentence are basically the same as female, and the variation range of male in the second sentence and the third sentence are far less than female. There is a big difference in reading style between male and female, which shows different speaker has different habit in poem reading.

#### 4. Pause duration analysis

There are three levels of couplet pause in motto poem reading, and each couple consists of two sentences. The pause between two couplets is a big pause, between two sentences is a middle pause, and within one sentence is a little pause.

##### 4.1 Total pause duration analysis

To calculate the total pause duration in unit of the entire poem. The longest duration of male is 2.38 second, the shortest is 1.21 second, and average duration is 1.63 second. The longest duration of female is 2.17 second, the shortest is 1.16 second, and average duration is 1.64 second. The average pause duration of male and female are the same. Figure 6 and Figure 7 show the pause frequency distribution of male and female.

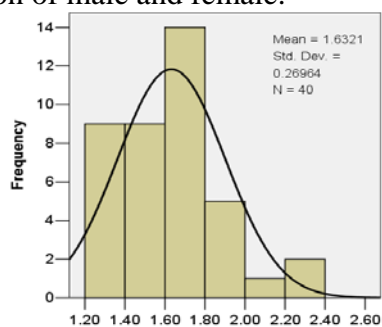


Figure 6 Pause frequency distribution of male

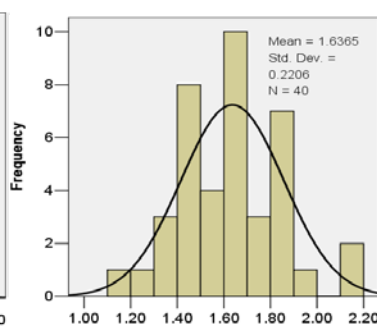


Figure 7 Pause frequency distribution of female

##### 4.2 Pause duration analysis between two sentences

As shown in Figure 8, Pause 1 shows pause at the end of the first sentence, Pause 2 shows pause at the second sentence, and Pause 3 shows pause at the third sentence. The duration range of male at Pause 1 is between 0.3 and 0.9 second, at Pause 2 is between 0.3 and 1 second, and at Pause 3 is between 0.3 and 0.7 second. The duration range of female at Pause 1 is between 0.4 and 0.7 second, at Pause 2 is between 0.5 and 0.8 second, and at Pause 3 is between 0.2 and 0.7 second. The variation range between two sentences of male are: 0.64 second, 0.76 second and 0.44 second. The variation range between two sentences of female are: 0.35 second, 0.56 second and 0.6 second. Figure 8 and Figure 9 show the pause duration horizon between sentences of male and female, respectively.

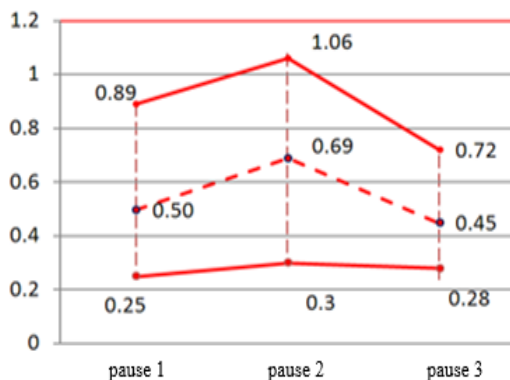


Figure 8 Pause duration range of male

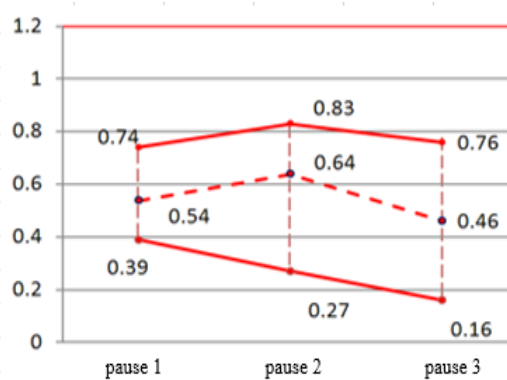


Figure 9 Pause duration range of female

From Figure 8 and Figure 9, on the whole, the pause duration range of male between sentences is wider than female, and changes bigger. The longest duration is Pause 2 which is between the first couplet and second couplet, then is Pause 1, and the shortest is Pause 3. The pause duration range of female between sentences is narrower than male. The longest duration is Pause 2, then Pause 1 and the shortest is Pause 3. The change of pause duration range of male and female are the same. The difference is at Pause 3, the pause duration of female is unsteadily and changes greatly.

## 5. Conclusion

This paper selects 40 pomes from Sajia Motto to reading, extracts segment and pause time parameter for rhythm analysis, and carries out the comparative study between male and female. In the mass, the total segment duration of female is longer than male, and the pause duration distribution of male and female are the same. This shows that physical air change and psychological semantic pause of male and female are the same. The durations of female in sentence, total text and segment are longer than male and relatively concentrated. Sentence pause, whether male or female, shows the same rule: the longest pause duration is between the first couplet and second couplet, pause at the end of the first sentence is the second longer duration and the shortest duration at the end of the third sentence. On the whole, the reading style of male is quite different from female, which illustrates that different person has different reading style. Rhythmic pattern of poem reading is single, but rhythmic pattern of other literary form is different between male and female which needs deeper discussion. The immanent cause and mechanism of rhythm performance, on the one hand present rhythmic feature of different literary form better, and on the other hand provide certain help to reading education.

## Acknowledgments

Thanks for the support of the natural science fund project (2015ZR-14-19) of the Tibet Autonomous Region.

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