# ERMSS_WL_The Prosodic Encoding of Focus in Lujiang Dialect

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## Abstract

Focus is the component highlighted in the sentence, which can be broadly divided into broad focus and narrow focus. Prosodic encoding of focus can be reflected in pitch, duration, and intensity. Different languages and dialects exhibit different characteristics. This paper takes the Lujiang dialect of Anhui Province as the research object and discusses the prosodic encoding of focus in different tones under both broad-focus and narrow-focus conditions. The results show that the prosodic encoding of focus in the Lujiang dialect is reflected in pitch, duration, and intensity.

## Full Text

## The Prosodic Encoding of Focus in Lujiang Dialect

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**Abstract.** Focus refers to the highlighted component in a sentence and can be broadly categorized into wide focus and narrow focus. The prosodic encoding of focus manifests through variations in pitch, duration, and intensity, though different languages and dialects exhibit distinct characteristics. This study investigates the prosodic encoding of focus in the Lujiang dialect of Anhui Province, examining both wide and narrow focus conditions across different tones. The results demonstrate that focus in Lujiang dialect is prosodically encoded through systematic modifications of pitch, duration, and intensity.

## 1. Introduction

The linguistic concept of focus, first proposed by Mathesius of the Prague School in 1929 [1], remains a central topic in linguistic research. Focus can be divided into two main types: wide focus and narrow focus. Wide focus occurs when the entire sentence carries focus, typically used to answer questions like "What' s wrong?" or "What happened?" In contrast, narrow focus targets specific information, answering questions such as "Who?" or "Where?"

While focus is commonly highlighted through sentence stress, the specific prosodic encoding mechanisms warrant detailed investigation. The definition of stress itself requires clarification. The most widely accepted definition identifies stress as the perceptually most prominent syllable in an utterance [2]. However, scholars have proposed different acoustic correlates: Zhao (1979) [3] characterized stress by pitch range expansion and duration lengthening, followed by increased airflow; Lin (1990) [4] emphasized pitch, duration, and intensity as primary cues; and Cao (2002) [5] described stress as a comprehensive enhancement of four prosodic elements—significantly longer duration, higher pitch, greater intensity, and more typical timbre. Across these perspectives, pitch and duration emerge as the most critical prosodic parameters.

Numerous acoustic experiments on focus in languages such as English [6], Japanese [7], and Korean [8] have demonstrated a consistent pattern: pitch raises on the focused element and compresses afterward, a phenomenon termed Post-Focus Compression (PFC) [9]. However, PFC is not universal; languages like Yi [10] and Vietnamese [11] lack this feature.

The situation becomes more complex in Chinese, a tone language where dialectal tone systems introduce additional layers of complexity. Pitch variation in actual speech is constrained by interactions between lexical tone and intonational effects. While Mandarin Chinese has been shown to exhibit PFC [9], dialectal variation is substantial: some dialects like Minnan [12] and Cantonese [13] lack PFC, whereas Wu dialects such as Suzhou and Changzhou show significant PFC [14]. Even among PFC-exhibiting dialects, the realization patterns differ, as seen in Shandong dialect [15].

This study examines the Lujiang dialect, a variety of Jianghuai Mandarin, investigating pitch patterns across different tones alongside duration and intensity variations. Lujiang County, located in Hefei City, Anhui Province, covers approximately 2,348 square kilometers with a population of 1.193 million residents [16]. According to Zhou (2001) [18] and the authors' fieldwork, Lujiang dialect possesses 25 initials, 49 finals, and six tones (55, 31, 213, 35, 5, 3). This experiment employs the first four tones as test materials.

## 2.1 Material

To investigate pitch variation in focus position, it is essential to control for tone combination effects—that is, to systematically manipulate the tonal composition

of both the focus word and the entire sentence. The experimental materials consist of seven-syllable declarative sentences. Except for the disyllabic focus words, all other syllables carry the Yin Ping tone (value = 55). The IPA transcriptions and sentence meanings are presented in Table 1 , with focus words underlined.

In order to analyze pitch variation across focus conditions, we compare phonetic parameters under wide focus and narrow focus contexts. Two types of lead-in questions were designed: "What happened?" to elicit wide focus, and "Who flies to Tokyo today?" to elicit narrow focus.

## 2.2 Subjects and Recording

Eight speakers aged 18–30 participated in the experiment (four male, four female). All were native Lujiang speakers, fluent in the local dialect, and had no speech or hearing disorders. Participants were unaware of the experiment' s purpose.

Recordings were conducted in a quiet environment using a laptop, Sony headset, and Adobe Audition 3.0 software. Experimental materials were presented in random order on a computer screen. After hearing a lead-in question, participants responded using the displayed sentence materials.

## 2.3 Data Analysis

Following preprocessing, recordings were segmented and annotated in Praat. Phonetic parameters were then calculated using MATLAB:

**(1) Pitch:** An auto-correlation algorithm extracted fundamental frequency (f ) from the speech signal. Ten f points were sampled at equal intervals from each sentence, with outliers subsequently removed. The f values were converted to semitone values using 50 Hz as a reference, according to the formula:

$$f = 12 \times \log_2 \left( \frac{f_0}{50} \right)$$

**(2) Duration:** Segment durations were measured in milliseconds using Praat.

**(3) Intensity:** Amplitude curves were extracted via Praat and normalized to a 50 dB reference value.

## 3.1 Pitch

Pitch represents a crucial parameter for focus realization. Sentences were divided into three regions: pre-focus, focus, and post-focus. Normalized pitch contours for the four experimental sentences are shown in Fig. 1 [Figure 1: see original paper], with time on the horizontal axis and semitone values on the vertical axis. Solid lines represent wide focus, dotted lines narrow focus.

The data reveal three consistent patterns: (1) pitch at the focus position is significantly higher; (2) pitch in the pre-focus region shows no significant variation; and (3) pitch declines in the post-focus region.

## 3.2 Duration

For duration analysis, sentences were segmented into four components: pre-focus, pause before focus, focus, and post-focus. Fig. 2 [Figure 2: see original paper] displays mean durations across these regions, with the vertical axis showing milliseconds and the horizontal axis representing the four sections. Dark bars indicate wide focus, light bars narrow focus.

Results show that narrow-focus sentences exhibit slightly shorter post-focus durations and significantly longer pauses before the focus compared to wide-focus sentences. This pattern suggests durational compression in post-focus syllables.

## 3.3 Intensity

Mean intensity contours are presented in Fig. 3 [Figure 3: see original paper], with time on the horizontal axis and intensity (normalized to 50 dB) on the vertical axis. Solid lines denote wide focus, dotted lines narrow focus.

Intensity data reveal that only the focus position shows significant differences, with narrow focus exhibiting higher intensity than wide focus. Focus does not substantially affect intensity in pre- or post-focus regions; the primary effect is intensity enhancement at the focus itself.

## 4. Conclusion

Based on sentences with wide and narrow focus, this study examined the prosodic encoding of focus in Lujiang dialect through the parameters of pitch, duration, and intensity. The findings can be summarized as follows:

(1) **Pre-focus region:** Pitch and intensity remain unaffected; duration shows significant lengthening.

(2) **Focus region:** Both pitch and intensity increase substantially, with concurrent lengthening. Notably, a brief pause appears between the focus and pre-focus segments.

(3) **Post-focus region:** PFC manifests through clear pitch compression. Intensity shows no significant change, while duration exhibits slight shortening. Further research is required to confirm the durational compression effect.

These results demonstrate that focus in Lujiang dialect engages all three prosodic dimensions—pitch, duration, and intensity. The conclusions warrant verification through comparative studies of similar dialects.

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*Note: Figure translations are in progress. See original paper for figures.*