



# Analysis Of Double-Word Tone Bias

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**Abstract.** Tone is an indispensable part of the Chinese phonetic system. It is a pitch change that runs through the whole syllable to distinguish the meaning of words and part of speech. This characteristic presents a unique challenge for preschool children, who are in the early stages of language acquisition [1][2]. Inaccuracy of tone often leads to semantic confusion. In this study, the corpus audio is extracted and processed using Praat software and t-value analysis, and the tone bias shown by learners in the test is sorted out and analyzed. The results show that the word with the first word with the falling-rising tone has the highest bias rate, and the word with the rising tone as the first word has the lowest error rate. The main reasons for bias include ignoring the voice change of the flow and the negative migration of the mother tongue.

**Keywords:** tone of words, connected speech processes, bias analysis, preschool children

## 1 INTRODUCTION

Modern Chinese Mandarin has four tones, which indicate the change of syllables. They are divided into four tones: level tone, rising tone, falling-rising tone, and falling tone, which have a distinguishing role. Chinese is a tonal language, and Chinese tones can differentiate meanings of Chinese characters [3]. Zhao Jinming (1997) emphasized that the learning of tone is particularly important in the whole process of phonetic learning. Chinese tone plays the role of distinguishing part of speech and meaning of words. Tone teaching is both a key and a difficult point. Unlike single-word tone, the tone of words needs to go through the transition of the flow of speech [4]. When pronouncing, the tone of the words before and after will affect each other, resulting in different degrees of bias. Yang Rui (2009) proposed that tone is the biggest obstacle for the vast majority of Chinese learners to master Chinese phonetics. Whether the mother tongue is a tone language or a non-tone language, learners will have different types of biases and show different bias characteristics.

The selection of the test materials in this article is the matching of 16 groups of key values prefixed with level tone, rising tone, falling-rising tone, and falling tone respectively. That is, in standard Mandarin, the key values of the level tone combination are: 55+55, 55+24, 55+212, 55+51; the rising tone combination is: 35+55, 35+24, 35+212, 35+51; the falling-rising tone combination is: 21+55, 35+24, 35+212, 35+51; the

falling tone combination is: 52+55, 52+24, 52+212, 52+51. The learner reads and records it, and then uses the software praat to extract the base frequency and draw the average T-value table. T-value analysis further aids in quantifying these deviations, offering a statistical framework to understand the extent and nature of tonal errors. By combining these tools, the research provides a robust methodological approach to studying tone acquisition errors. By identifying the most common types of tonal errors and their underlying causes, this research aims to contribute to the development of targeted educational interventions that can improve tone accuracy in young Mandarin learners[5].

## 2 THE TONE BIAS RATE AND CHARACTERISTICS OF PRESCHOOL CHILDREN

### 2.1 Bias Rate

The tone bias rate is the deviation rate of the first character affected by the latter character, that is, the bias rate of the combination of level tone + rising tone is the bias rate of the first word yin flat with the first word of Yang. For details, see Table 1.

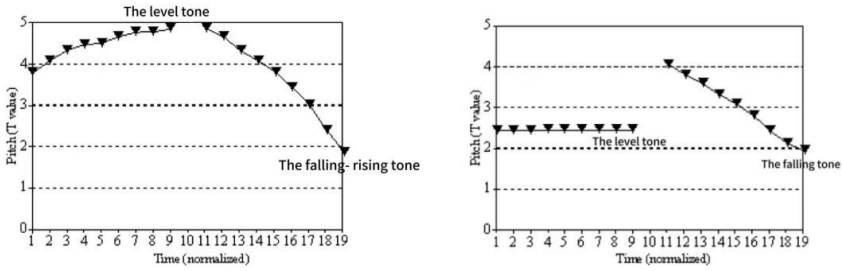
**Table 1.** Error rate table

Initial character	Combination	Representative words	Bias rate	Overall bias rate
the level tone as the first word	level tone+level tone	Sky	0%	30%
	level tone+ rising tone	Help	5%	
	level tone+falling-rising tone	Parrot	65%	
the rising tone as the first word	level tone+falling tone	Black	50%	17.5%
	rising tone+ level tone	Panda	0%	
	rising tone+ rising tone	Classmate	0%	
	rising tone+falling-rising tone	Mouse	40%	
	rising tone+falling tone	Red	30%	
the falling-rising tone	falling-rising tone+ level tone	Hawk	95%	72.5%
	falling-rising tone+ rising tone	rainbow	90%	
	falling-rising tone+falling-rising tone	Tiger	100%	
	falling-rising tone+falling tone	Purple	5%	
the falling tone as the first word	falling tone+ level tone	Summer	0%	21.25%
	falling tone+ rising tone	Bean sprouts	10%	
	falling tone+falling-rising tone	Computer	75%	
	falling tone+falling tone	Green	0%	

### 2.2 Characteristics of Tone Bias in Preschool Children

The Mandarin tone of preschool children investigated in this article is a phrase with a bias rate of more than 10%, that is, level tone +falling-rising tone, level tone +falling tone, rising tone+ falling-rising tone, rising tone + falling tone, falling-rising tone + level tone, falling-rising tone+rising tone, falling-rising tone+ falling tone and falling tone + falling-rising tone combinations.

**The Level Tone.**



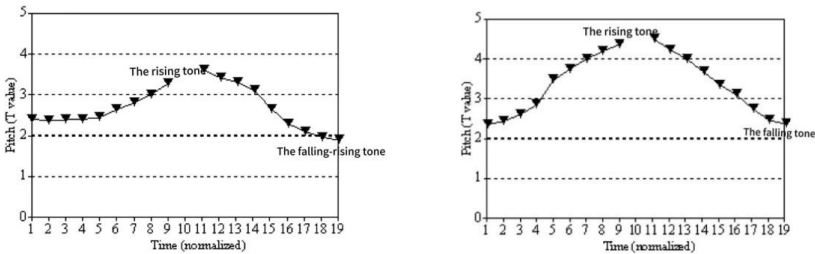
**Fig. 1.** the level tone as the first word chart

Among the words with the level tone as the first word, the tuning deviation rate of the words in the two combinations of level tone + falling-rising tone and level tone+ falling tone is relatively high, which is 65% and 50% respectively. See Figure 1 for details:

The tone value of level tone + falling-rising tone is 45+52, which is much different from the standard Mandarin tone value of 55+212, and there is a more obvious bias. The reason is that under the influence of the first word, it is difficult to find the accurate starting tone of the pronunciation of the second word. The starting key is too high, and the tortuous tone drops for too long, resulting in the mixing of its tone and the device. The correct focus of pronunciation should be in the turning tone part. Many preschool children find it difficult to realize this, which prolongs the pronunciation of the descending part. Between, resulting in bias.

The tone value of level tone+ falling tone is 33+52, and the standard Mandarin tone is 55+51. There is a deviation in the initial tone, which should be a high flat tone, while preschool children usually pronounce it as a sub-high flat tone. Although the post-word tone is accurate to high and lower, the ending is too high, and the tone pronunciation is not in place. The main reason is that the learning time of Mandarin is relatively short, only two months, and the tone change of the tone group of level tone+ falling tone is generally declining. As long as it reflects the downward trend of tone, it will not have much impact on hearing, but there is still a difference from standard Mandarin.

**The Rising Tone.**



**Fig. 2.** the rising tone as the first word chart

Among the words with the rising tone as the first word, the overall bias rate is the lowest, accounting for only 17.5%. Among them, the tuning bias rate of the two combinations of words, rising tone+falling-rising tone and rising tone+falling tone, is higher, which is 40% and 30% respectively. See Figure 2 for details:

The tone value of rising tone+falling-rising tone is 34+42, which is slightly different from the standard Mandarin tone value 35+51. The reason is the weakening of the tone. In the tone, because of the relatively high requirements for tone control, many children have the problem that the tone value does not rise and falls enough enough, and the overall tone value change is not obvious.

The tone value of rising tone+falling tone is 35+53, and the standard Mandarin tone value is 35+51. The tone of the latter word is not in place. The reason is that the mother tongue of most children in kindergartens rising tone dialect and Yangchun dialect, which belongs to the Cantonese dialect, while the high tone of the Cantonese dialect is rising tone, and the tone value is 53, which changes with the tone of preschool children. The tone value of the last word in matches, and the phenomenon of mother tongue migration mentioned by Odlin (1989) appears, that is, the learner's first language and mother tongue usage habits directly affect the acquisition of the second language and interfere with it, resulting in bias in the child's pronunciation.

### The Falling-Rising Tone.

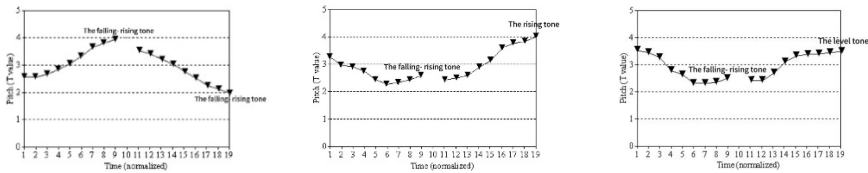


Fig. 3. the falling-rising tone as the first word chart

Among the words with the falling-rising tone as the first word, the overall deviation rate is the highest, accounting for 72.5%. The tortuous tone of the upper tone shows a trend of falling first and then rising. Many learners can't make a good falling-rising tone, and there has been obvious bias in the monotone. In this tone combination, the falling-rising tone is the first tone, and the deviation is more serious. Among them, the word bias rate of the three combinations of falling-rising tone+level tone, falling-rising tone + rising tone and falling-rising tone + falling-rising tone is 95%, 90% and 100% respectively. See Figure 3 for details:

The tone value of falling-rising tone+level tone is 43+34, which is quite different from the standard Mandarin tone value 21+44. Although the tone of the first word is on a downward trend, there is a deviation in the value domain. The reason is that under the influence of the upper tone, preschool children will habitually pronounce their tone as descending first and then rising, but in fact, because the latter character does not need to change the tone, in the process of learning the monotone, out of habit, the upper vocal awareness is relatively strong, so they ignore the voice change when pronouncing the tone and confuse the tone value

The tone value of falling-rising tone + rising tone is 43+35, and the standard Mandarin tone value is 21+24, and the value domain is purely in deviation. The reason is that it is difficult for preschool children to quickly find an accurate starting tone in the face of falling-rising tone, and children's pitch will be affected by emotions. When they want to focus on expressing a word, they usually emphasize by increasing the volume, which will directly cause value domain deviation. The tone of the last word is correct, but there is a pronunciation deviation. Like, that is, in the process of language conversion, the language user brings his mother tongue characteristics into the target language. In the Cantonese dialect, the dark departing adjustment value is 35, which coincides with the tone of the latter word, while there is no tone of 24 in Cantonese.

The deviation of falling-rising tone + falling-rising tone phrases is the highest, reaching 100%. The tone value is 34+43, and the standard Mandarin tone value is 35+212. The reason is that both words of the phrase have a change of tone, which is difficult for beginners in tone. Basically, the intone can only be identified by listening and identification, and there is no way to find an accurate value domain. At the same time, it is also affected by the first word. The beginning tone of the last tone of the last word of the first word is assumed, and the trend declines, There is little difference in hearing, but in fact there is still a big difference from standard Mandarin.

### The Falling Tone.

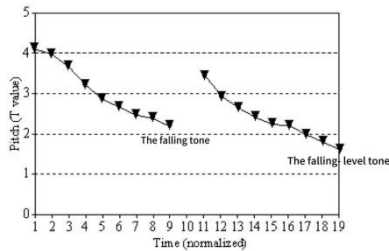


Fig. 4. the falling tone as the first word chart

Among the words with the falling tone as the first word, the tone deviation rate of the words combined with falling tone + falling-rising tone has a high rate, accounting for 75%. See Figure 4 for details:

The tone value of the falling tone + falling-rising tone is 53+42, which is much different from the standard Mandarin tone of 52+212, and there is a bias error. The downsizing of the first character is not in place, and the last word only downs the tone does not reflect the trend of tone change of twists and turns. The reason is that preschool children do not grasp the center of gravity of the tone part. The first word is too short, and the last word is too long. The tone is ignored, resulting in bias.

### 3 CONCLUSION

There are still great challenges in preschool children in learning tone. The reasons for these biases are: First, pay attention to the learning of monotone and ignore the change of tone. Preschool children usually mainly use single words in the early stage of learning new words. In the process of learning single words, they will pay attention to their pronunciation and tone changes, so that when learning the tone, they will ignore the change of tone and still retain the tone habit of a single word. The auditory difference is small and does not affect understanding, but there is still a big difference from actual Mandarin. The processes that take place in the brain while processing language are only partly cognizant. Mostly they are automatic and they are a concurrence of complex actions. This also applies to the processes of learning in language acquisition. This is one reason why language didactics should put more emphasis not to see and treat mistakes simply as a breach of the rules and consider them as “wrong” or “incorrect”. Instead they should be seen within their context and from this point of view be corrected with suitable measures [6]. Second, the mother tongue is negatively migrated. The interference of the first language is one of the main reasons for bias in Mandarin in preschool children. perception and discrimination of tones are heavily influenced by a listener’s language experience and their degree of familiarity with lexical tones [7]. The first language of most children in Yangjiang City is Yangjiang dialect or Yangchun dialect, and they are also more inclined to use dialects in daily communication. However, there is a big difference between the nine sounds and six tones of the Cantonese dialect and the four tones of Mandarin, and the changes are more complex. For preschool children, the tone changes are easy to confuse, that is, the deviation of some tones coincides with a monotone in the dialect, or there are situations such as "pronunciation substitution" and "pronunciation deviation".

Mandarin Chinese is a tonal language, meaning that the pitch contour or intonation pattern of a syllable can change the meaning of words [8][9]. In order for preschool children to better master the voice change of the flow, it is recommended to strengthen the training of dynamic two-word tone in the flow, referring to the theory proposed by Cheng Xiao (2011). On the basis of learners mastering the static tone, they should also pay attention to the cooperative training of dynamic tone, and gradually master the pitch of the tone in the flow. Changes and the coordination between each tone, in order to effectively avoid the mutual interference between monotone and the flow of speech, when conducting flow training, you can pause for a moment after reading the previous single word, and then send the latter single word.

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