

# Review of Chinese Tones Acquisition by Non-tonal Language Speakers Taking English as an Example

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## ABSTRACT

When English speakers learn Chinese, we will find that a very important reason for their non-standard Chinese is that they cannot pronounce the correct Chinese tones. Learning tonal languages can be a challenge for native speakers of tonal languages. This paper mainly summarizes the research on the learning of Chinese tones by native English speakers over the past 20 years, shows the defects existing in the learning of Chinese tones by native English speakers, and confirms that native English speakers can acquire Chinese tones, and difficulty in acquiring Chinese tones. It is hoped that the teaching methods of Chinese tones can be continuously improved, so that it will be beneficial for native English speakers to learn Chinese.

**Keywords:** *Chinese Tones, Native English Speakers, Second Language Acquisition*

## 1. INTRODUCTION

Chinese has always been recognized as one of the most difficult languages in the world to learn. When we observe people in many European and American countries speaking Chinese, we can find that a very important factor in their non-standard Chinese speaking is that they cannot pronounce standard tones. The acquisition of Chinese tones is indeed a difficult problem for native speakers of non-tonal languages such as English, and there are countless studies on Chinese tones in the past two decades. These studies largely show us the intuitive performance of native English speakers when learning Chinese tones (These performances are usually reflected in that they are defective in this area or that learning Chinese tones is difficult for them). Then we will think about how they can acquire Chinese tones.

In the past research and experiments, there are already many experimental results that can inspire tone teaching, but effective learning methods have not been further formed. Nowadays, Chinese has become the second language acquisition choice for people in many countries and regions. If we can explore more learning applications, it will undoubtedly help more native English speakers learn Chinese tones well.

## 2. CHINESE TONES

### 2.1. Phonetics of Tones

Sound is produced by vibration. We can make sounds because of the vibration of the vocal cords. Musical instruments like guitars make music because of the vibration of the strings. Sound is high and low, and the pitch is related to the frequency of the sound vibration. The higher the frequency of sound vibration, the higher the pitch. Women and children have thinner vocal cords, so the pitch of their vocalizations is usually higher than that of men.

Tone is a vocabulary in the category of linguistics, it is also an important part of phonetics. The realization of tone is a process in which a specific pitch is associated with lexical information. It does not require an absolute pitch, but needs to complete a relative range change process [1].

### 2.2. Chinese Tone Variations

In Chinese tones, in addition to the established individual tone rules, Chinese tones will change with the influence of adjacent tones in coherent pronunciation. There are two main types of tone changes through context changes: tone coarticulation and Chinese tone sandhi.

Tone coarticulation are subtle changes in the contours

of a pitch under the influence of adjacent pitches. For example, when a T4 (the fourth tone) is followed by a T4, the ending of the first T4 is not as low as it would be with the monophonic rule. But if a T4 is followed by a T3 (the third tone), then the T4 will sound exactly as monophonic. Two effects in this phenomenon are anticipatory coarticulation and carryover coarticulation. Anticipatory coarticulation is a subtle change in a speech that is influenced by sounds in front of it, and carryover coarticulation is a subtle change in a speech that is influenced by sounds behind it. These two effects are very common in Chinese tones [1].

Tone sandhi is an categorical change in tone. This kind of change is out of the original tonal range and transformed into another tonal range of speech. When the tones are connected in the context, people will be restricted by the vocal organs when they vocalize. This is not voluntary, but a natural result. For example, some T1 in Chinese are often unconsciously read as T4 in idioms, and these phenomena accumulate to form tone sandhi.

### **2.3. Acquisition of Mandarin Chinese Tones**

The Chinese tone system is a dynamic and systematic whole [1]. The acquisition of Chinese tones requires learners to have a good understanding of Chinese phonology and to master the changes of tones between different contexts. Chinese tones themselves are a major difficulty in Chinese learning, and it will be even more difficult for native English speakers because they have not been taught tones since childhood.

In the learning process, imitating the pronunciation of Chinese tones is undoubtedly the most useful method. In addition, musical ability can be very helpful in learning tones. Improving tone perception is also an effective way to master Chinese tones.

## **3. NATIVE ENGLISH SPEAKERS HAVE DIFFICULTY LEARNING TONES**

### **3.1. Biological Deficit**

Previous research has shown that tone should be processed not just as a pitch information, but as a linguistic information [2]. For native Chinese speakers, after being trained from childhood to adulthood, they can naturally process them into language information when faced with tones. But for native English speakers, one of the reasons why it is difficult for them to correctly identify tones is that their processing of tones is usually only at the pitch level. The root cause of this phenomenon is that English is a toneless language. And without intonation training, their physiological responses are blank in processing tones.

In a PET study, Mandarin tone tests were administered to native Mandarin speakers and native

English speakers. The findings showed that only native Mandarin speakers showed additional activation in the frontal, parietal and parieto-occipital regions of the left hemisphere. In contrast, native English speakers' active areas were concentrated in the right inferior frontal cortex [2]. Another experiment claimed that native speakers of a non-tonal language made a far greater number of errors in recognizing tones than in recognizing speech, mistaking tones for pitches in the absence of tonal training blanks [3].

Therefore, language experience may affect the brain circuits that process auditory information [2]. Native English speakers lack this biological process, making it challenging for them to learn tones.

### **3.2. Pitch Contours with Discrete Pitch Labels**

An Indiana University study asked some native English speakers to imitate and read Chinese tones separately, and the results showed that imitation was more accurate than reading [4]. This suggests that native English speakers can easily identify pitch contours, but have difficulty correlating these pitches with pitch labels.

For native English speakers, the biggest difficulty in learning Chinese tones is not to produce the correct tones, but to assign the sounds they hear to a limited category of tones, or to make them produce the correct tones according to the tone labels. They don't really grasp the correlation between pitch and tone type. In addition, Chinese tones are not marked in Chinese orthography. So when learners read and write Chinese, the association between pitch and tone labels is not strengthened, which is also an aspect of their lack of training.

### **3.3. Tones in Vocabulary**

An experiment on Chinese tone perception ability tested native English speakers who had achieved high levels of second language learning. The results showed that most learners could achieve perceptual classification of isolated tones. But for disyllabic words' tasks (LDT and SJT), they showed difficulty [5].

This result tells us that even in highly trained individuals, their tonal discrimination in disyllabic or polysyllabic words is not at the native level. To put it more intuitively, Chinese tones are particularly difficult to perceive in two-syllable or multi-syllable words, and the number of syllables will affect the difficulty of tone acquisition. This is undoubtedly a big challenge for English learners.

### **3.4. Native English Speakers Can Master Chinese Tones through Acquired Learning**

Native English speakers do not have tonal training innately, so it is difficult to learn tones when they acquire

Chinese. But they can gradually master Chinese tones through acquired learning. Many studies have confirmed this.

One study invited native English speakers without Chinese learning experience, native English speakers with advanced Chinese learning level, and native Mandarin speakers to test Chinese tone perception ability. It is worth noting that those native English speakers with advanced Chinese level The performance on the Chinese tone recognition task is better than that of native English speakers without Chinese learning experience. Although they only learned Chinese in adulthood, these experiences were enough to change their tonal perception boundaries and make them more likely to master tonal classification when dealing with tones [6-7]. Another experiment explores the effect of perceptual training on the mastery of Chinese tone sandhi rules by native English speakers. In the experiment, the testers conducted a pre-training test and a post-training test, and the results showed that the effect of the post-training test was better [8-10]. Those who have no experience in tonal learning can also learn to master the rules in tones.

Through continuous learning and training, a native speaker of a toneless language can master tones and gradually understand the language function of tones. Language experience is undoubtedly the basis for acquiring language rules.

## **4. RESEARCH ON THE ACQUISITION OF THE THIRD TONE**

### ***4.1. Research Status***

T3 has always been regarded as the most difficult tones in Chinese to learn. Now the main teaching method in many parts of the world is called "Full-T3 First", which advocates teaching Full-T3 to learners first. Full-T3 is the third tone of Chinese. A complete third tone is accompanied by the transition of pitch from top to bottom and then to top. While Half-T3 is an allophone derived from Full-T3, it is also its most widely distributed allophone.

In the survey by Zhang and Lai (2010), native Mandarin speakers used the HT3 rules more precisely. One conjecture is that learning FT3 means mastering a more complex tone profile, so they prefer using HT3. HT3 only contains two pitch levels, rising and falling, this can make learning much less difficult [1].

### ***4.2. Experiment of Half-T3 and Full-T3***

A study investigating the use of FT3 and HT3 conducted several experiments. In an experiment, the perceptual experiments of HT3 and FT3 were conducted on English native speakers, elementary, intermediate and advanced learners who had no Chinese learning

experience. The experimental results show that for those with blank learning experience, elementary and intermediate learners, although HT3 is considered to be a simpler T3, it is the one with the highest error rate. But for advanced learners, they can mostly identify HT3 very well [1].

However, with the deepening of learners' learning level, the error rate of HT3 decreases suddenly, which means that HT3 is the key for learners to master T3 [1]. Therefore, the researchers concluded that the reason for the high error rate of HT3 is that the "Full-T3 First" teaching style makes the learners too focused on the basic concepts of T3. Teaching at T3 needs improvement.

### ***4.3. Implications***

Two new research directions have been derived regarding the research mentioned above, one is about the basic form of T3, another is the teaching method of "Half-T3 First".

Researchers tend to think that the basic form of T3 is HT3. Many literatures also prove this point of view. Many children acquire HT3 earlier than FT3. In the early Mandarin books, the mentioned Mandarin T3 rule is Pre-T3 Sandhi Rule [1].

In the 1980s, the "Half-T3 First" teaching method has been proposed, but the "Full-T3 First" teaching method is widely used in Chinese teaching, so this method has been questioned many times. But in fact, after research, we can find that the "Half-T3 First" teaching method has many advantages. It can simplify the learning process of T3, avoid the confusion between T2 and FT3 for beginners. Therefore, the feasibility of this method remains to be studied and discussed.

## **5. STRATEGIES FOR TEACHING ENGLISH SPEAKERS CHINESE TONE**

In the past two decades, the research on the learning of Chinese tones by native English speakers has made little achievements in second language acquisition. In fact, we can find some practical experimental results in some research, such as musical melody and perceptual training are helpful for tonal learning. However, these methods require further research to form systematic teaching methods and learning methods, especially simple and easy-understanding learning methods, which can be used by learners in daily life. Chinese tone itself is a learning difficulty for native English speakers. Effective learning methods can help learners build learning confidence and master Chinese tones.

### ***5.1. Perception Training***

Perceptual training is the most effective way for learners to learn. For beginners, the first step is to train listening. Repeatedly listening to the recordings of native

Chinese speakers can return to the tone learning itself. The second step is active awareness. After practicing listening, learners should take the initiative to imitate and practice their own vocalization. Most Chinese teachers respect the combination of listening and pronunciation training, because mobilizing the senses is the best way to exert the physiological mechanism of the human body and truly understand and master pronunciation learning.

Pinyin was developed in the 1950s and is now the main system for learning Chinese phonetics. However, pinyin is a hindrance to tonal learning, and many second language acquisition researchers have confirmed this through research. Pinyin is suitable for learning the pronunciation of Chinese characters, but it is not suitable for tones, so returning to listening is the best choice for learning tones[1].

### **5.2. Music Melody Teaching Method**

Studies have shown that people with a strong sense of musical melody are more sensitive to changes in pitch. Therefore, training music melody for native English speakers who want to learn Chinese tones will help them understand tonal changes. Because it may be difficult for native speakers of tonal languages to understand the continuity of tones[3]. But the musical melody is understandable to all people.

In the application of Chinese teaching, teachers can combine the understanding of musical melody with the understanding of Chinese tones. The common collocation of Chinese tones can also be compiled into tonal melody, so that learners can perceive it in a musical way.

### **5.3. Stress Training**

Stress training is also a necessary part of learning intonation. Because stress is also a part of Chinese phonology, there are many words with homophones and different meanings in Chinese, which need to be distinguished by stress. Learning stress in Chinese can make certain pitches in the same level of tones more prominent. This helps learners to distinguish pitches, and also helps learners understand soft sounds in Chinese.

In the teaching of Chinese phonetics, beginners should understand the division of stress. Through stress training, the tones can be transformed into a more rhythmic rhythm, which is beneficial to the learner's understanding.

## **6. CONCLUSION**

After summarizing and summarizing the main research on the learning of Chinese tones by native English speakers in the past two decades, we can find that they expose some similar problems when learning Chinese tones. In general, it includes the difficulty that

native English speakers have in learning Chinese tones, and the difficulty in acquiring Chinese tones themselves.

However, the existing research lacks the exploration of transforming the experimental results into applied methods. In the future, we should focus on providing simpler and more effective learning methods for Chinese language learners. We also need to improve Chinese teaching methods to give learners better guidance.

## **REFERENCES**

- [1] Zhang, "Second Language Acquisition of Mandarin Chinese Tones." (2018).
- [2] Klein, et al. "A Cross-Linguistic PET Study of Tone Perception in Mandarin Chinese and English Speakers." *Neuroimage* 13.4(2001):646-653.
- [3] Delogu, G. Lampis, and M. O. Belardinelli . "Music-to-language transfer effect: may melodic ability improve learning of tonal languages by native nontonal speakers?." *Cognitive Processing* 7.3(2006):203-207.
- [4] Hao, Y. "Second language acquisition of Mandarin Chinese tones by tonal and non-tonal language speakers." *Journal of Phonetics* 40.2(2012):269-279.
- [5] Pelzl, et al. "ADVANCED SECOND LANGUAGE LEARNERS' PERCEPTION OF LEXICAL TONE CONTRASTS." *Studies in Second Language Acquisition* (2018):1-28.
- [6] Shen, and K. Froud. "Categorical perception of lexical tones by English learners of Mandarin Chinese." *The Journal of the Acoustical Society of America* 140.6(2016):4396-4403.
- [7] Shen G, Levy E, Froud K. Perceptual learning of lexical tones by native speakers of English[J]. *Journal of the Acoustical Society of America*, 2014, 135(4):2353.
- [8] Li, Y. Yang, and S. Chen. "Evaluating the Effects of Perceptual Training on Application of Mandarin Tone Sandhi Rules by English Speakers." 2018 International Conference on Bilingual Learning and Teaching 2018.
- [9] Training Mandarin and Cantonese speakers to identify English vowel contrasts: Long - term retention and effect on production
- [10] Yip M. The symbiosis between perception and grammar in loanword phonology[J]. *Lingua*, 2006, 116(7):950-975.