

Heritage and Non-Heritage Chinese Students' Pitch Representation

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Abstract: Absolute pitch (AP), or perfect pitch, is the ability to name or reproduce a tone without reference to an external standard. This study adds to recent research investigating pitch in tone-language speakers, which has found effects for tone type, age, exposure and musical experience on how linguistic pitch is perceived and produced (Deutsch et al., 1999; Deutsch et al., 2004; So, 2006). However, it remains unclear how pitch representation is affected by bilingual language use. We tested the hypotheses that pitch was different for Heritage Chinese learners resident in the UK, compared to Non-heritage Chinese learners; that adults' representations will be different to children's; and that length of residence and musical experience would have a significant effect for both adults and children. Our findings echo Deutsch and colleague's data (1999, 2004) that musical training can aid correct perception and production of pitch. The findings have been applied to our Chinese language teaching, which has been approved effective.

Key words: absolute pitch, tone-language, musical training, Chinese pronunciation, effective

1. Introduction

Chinese is a tonal language, i.e., tones change the meanings of words. Since Mandarin has a limited number of syllables, there are a lot of homophones whose meaning varies with the tone. Therefore tones play a role in word meaning discrimination and are very important in Chinese phonology. However, in the teaching and learning Chinese pronunciation, the phenomenon of "foreign accents" bothers both Chinese teachers and foreign students greatly. The main reasons responsible for the "foreign accents" are Chinese tones and intonations. Teachers and researchers in teaching Chinese as a second language appear to consent that tones are one of major obstacles for Chinese learners in speaking (Hu, 2010). It seems that if the problems of tones and intonations were solved, then it would be much easier to teach the Chinese pronunciation and the foreign students can speak more standard and idiomatically.

However, the results of Chinese pronunciation teaching are far from being satisfactory. It becomes urgent to search for new methods from other perspectives. Researches from many disciplines find out that the ties between music and language are intertwined. Many successful experiments have also shown that it is quite possible and crucial to apply music to language teaching and learning. Therefore, the purpose of this study was to further investigate the connections between music and Chinese pronunciation, and to pinpoint effective methods for the Chinese pronunciation instruction.

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2. Absolute Pitch and Second Language Acquisition

As speculated, bilinguals process information in the parts of their brains different from monolinguals, and bilinguals and musicians tend to use similar parts of the brains. Hence, some recent studies have argued that music and language are related, e.g., Deutsch et al. (1999), and So (2006); and that pitch in a tonal language is an essential feature in conveying meaning of a word, the ability to identify the pitch of a tone is acquired through an inherent ability and training.

Diana Deutsch (1999, 2004), a professor in Psychology of Music found that tonal language learners who have it as their first language, are more likely to develop absolute pitch (also called perfect pitch). She defined absolute pitch as: "the ability to produce or identify the pitch of a tone without reference to an external standard". It is considered extremely rare faculty, with an estimated incidence less than one in ten thousand. Some argued that it is an inherited trait, others that it can be acquired through extensive training, and yet others that its attainment terriers that the individual have taken music lessons at an early age. Her research suggested that native speakers of two tone languages — Vietnamese and Mandarin, show remarkably precise absolute pitch in reading out lists of words. She inferred that the potential for acquiring absolute pitch may be universal, and that it can be realized by the association of pitches with meaningful words very early in life.

So and Best (2010), on the other hand, examined the perception of Mandarin tones by two groups of Cantonese and Japanese listeners–ten from each group (Ms = 21.7 and 23.8 respectively), with the hypotheses:

HP1: Cantonese listeners with greater linguistic experience in using pitch (variation) from their native language will perform better than Japanese listeners;

HP2: both Cantonese and Japanese listeners will also experience greater difficulties in perceiving Mandarin T1-T4 and T2-T3 pairs.

Both group students had no prior Mandarin knowledge or formal musical training. Their findings imply that linguistic experience of tones does not necessarily facilitate the perception of non-native tones.

3. Rationale of the Study

This study wish to add to the research investigating pitch in tone-language speakers, which argues for possible effects for tone type, age, and musical experience on how linguistic pitch is perceived and produced (Deutsch et al., 1999; Deutsch et al., 2004; So, 2006). However, it appears to be little research into how pitch representation is affected by Heritage Chinese Learners. Hence, our research questions are:

How pitch representation is affected by different types of language users?

Does music experience have effect on students' pitch representation?

Our hypotheses are:

Pitch was differently represented by Heritage Chinese Learners, compared to Non-Heritage Chinese Learners; and that adults' representations will be different to children's;

Musical experience would have a significant effect for both adults and children.

4. Research Methods

4.1 Participants

Twenty five Non-Heritage Chinese Learners (adults n = 17; children n = 8) and 28 Heritage Chinese Learners

(adults n = 21; children n = 7) resident in the UK participated in the study. The mean age of Non-Heritage Chinese adults and Non-Heritage Chinese children were: Ms = 25.7 and 10.9 respectively; SDs = 11.5; 1.2 respectively. The mean age of Heritage Chinese adults and Heritage Chinese children were: Ms = 31.8; and 9.4 respectively, SDs = 8.3; and 3.1 respectively.

4.2 Data Collection and Analysis

The data for the current study was collected through an individual background questionnaire including information such as age, length of residence in the UK and musical experience, and experiments. For experiments, accurate perception and production and tone confusion errors were measured on 24 randomized CV tokens of Mandarin tones: T1, high-level (\bar{a}); T2, rising (\dot{a}); T3, dipping (\check{a}); T4, falling (\dot{a}), using tests adapted from So (2006). All participants received a briefing on four tones (T1, T2, T3 and T4)and how the experiment would be carried out in Chinese. Participants' written judgements were collected on 12 CV real-word monosyllables (3 tokens per tone). Participants then listened to 16 CV real-world syllables (4 per tone), which repeated twice after a short pause, recorded by digital sound files. Descriptive statistical analyses and Independent-samples T-test were used to analyze the survey of participants' backgrounds variables, such as age. Chi-square and ANOVAs were employed to determine the significance of the mean differences between the learner groups, comparing groups by L1, age, type of tone, and musical experience.

5. Findings and Discussion

5.1 Findings from the Listening Part

The primary effect on variation in accuracy and tone confusion was caused by age, and centered on certain tones:

Non-Heritage Chinese adults were significantly more accurate than Non-Heritage Chinese children (p < .01) on T3;

Heritage Chinese adults were significantly more accurate than Heritage Chinese children on T4 (p < .01); Tone confusion was significantly different for Tone 3 than other tones (p < .05);

Non Heritage Chinese adult group had made more T2T3 & T3T4 errors than Non-Heritage Chinese children (p < .05).

5.2 Findings from the Speaking Part

The main findings for the speaking part are:

There were significant differences between groups in accuracy (p < .001 for T1 and T3; p < .05 for T2 and T4);

The Heritage Chinese children were significantly different on T1 and T3 (p < .001), and the Non-Heritage Chinese children were significantly different on T2 (p < .05);

Errors confusing five tone pairs were significantly different between groups (p < .001 for T1T2 and T1T3; p < .005 for T3T4; p < .05 for T1T4 and T2T4. And Heritage Chinese children were significantly different on T1T2; T1T3; T1T4; T3T4.

In addition, there were significant effect for musical experience on accuracy in production for T3 and T4 (p < .05).

5.3 Discussion

The findings seem contradictory to Critical Period Hypothesis, which proposes that after a certain period of one's childhood, it is impossible to acquire a second language with native proficiency. Although there is controversy about CPT in SLA, it was widely acknowledged in the phonology acquisition. It raised a question: Why did the Non-Heritage Chinese adults were better than Non-Heritage Chinese children? The reason may be that three of Non-Heritage Chinese adults have longer than 7 years musical experience (Ms = 5.5 and 2.9 respectively for NCH adults and NCH children), and in fact this study suggested that there were significant effect for musical experience on accuracy in production for T3 and T4 (p < .05).

6. Application

How tones should be taught and learned? The current study suggested that there were significant effect for musical experience on accuracy in production for T3 and T4 (p < .05). According to this finding, music related training may be encouraged and provided to advance students' tone learning. At Regent's University London, rhythms and songs were employed to teach students Chinese pronunciation. Typically, we use rhythms to practice reading and sing dialogues with the melody of easy songs. The students enjoyed these practices and approved these practices are greatly effective for enhancing their Chinese language pronunciation. Their feedbacks are, for example:

Music connects across cultures and can break down barriers;

Music stimulates memory;

Singing and learning lyrics increases vocabulary;

Singing a song improves pronunciation and can help to reduce foreign-sounding accent;

Listening to music improve comprehension of the language;

It's fun!

7. Conclusion

The findings from the current study echo Deutsch and colleague's data (1999, 2004) that musical training can aid correct perception and production of pitch, but strongly suggest that age is significant in creating stable pitch representations, since the Non-Heritage Chinese children often scored lower than the Non-Heritage Chinese adults, despite longer mean exposure to Mandarin. It also appears that problems in accuracy are tied to specific tones — similarly to So's (2006) findings, T3 is seen as a difficult tone to perceive and produce correctly whether for adults or children. These findings underscore the importance of understanding how pitch representations are formed and retrieved from long-term memory and the potential overlap of linguistic knowledge with general cognitive processes.

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