

Original Paper

A Research on the Use of Boundary Tone as a Turn-taking Mechanism in Chinese EFL Students' Conversations

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Abstract

The boundary tone is one of the crucial mechanisms for the organization of English conversations. But for Chinese learners, the acquisition of this mechanism is not satisfying. This study examines the use of boundary tones at the turn transitions in Chinese EFL learners' elicited English conversations. The results indicate that Chinese learners are not proficient in the use of boundary tones to show their intentions in turn exchanges, and the misuse of low L-L% boundary tone is the most prominent.

Keywords

boundary tone, organization of English conversation, turn-taking, Chinese learners

1. Introduction

Smooth and effective communication depends not only on proper use of words but also on the contributions of prosody and non-verbal factors, such as body language, paralinguistic means, and so on. Prosodic features play crucial roles in the management and organization of conversations, for example, speakers use prosodic features to signal their intentions of turn yielding or turn holding; listeners identify the intentions of speakers and obtain the floor by the employment of prosodic features. Thus, the appropriate use of prosodic features is an indispensable part of conversation strategies or skills.

In second language acquisition, investigations into prosodic features used in turn-taking are significant, because it can help to reveal not only the language learners' competence but also their acquisition mechanisms of conversational skills.

Due to the significance of boundary tones in organization of English conversations (Halliday, 1970; Crystal, 1975; Gumperz, 1982; Couper-Kuhlen, 1986; Petrone et al., 2017; Ludusn & Schuppler, 2022; Xia et al., 2004, 2023; Xia, 2013; Xia & Ma, 2016a, 2016b), this study aims to assess Chinese EFL

learners' use of boundary tones during the process of turn-taking for conversation organization (Sacks, et al., 1974; Romero-Trillo, 2019), and attempts to answer the following questions:

- 1) What are the characteristics of boundary tones used by Chinese EFL learners during the process of turn taking?
- 2) What are the differences in the use of boundary tones in turn taking between Chinese EFL learners and English native speakers?

2. Boundary Tone

This study adopted Pierrehumbert's (1980) descriptive model of boundary tones, and the five types of boundary tones and their projectability for turn-taking are summarized in Table 1 ("hold" for keeping the floor and "change" for yielding the floor).

Table 1. Five Boundary Tones and their Projectability for Turn-taking

Boundary Tones	Symbol	Projectability for Turn Taking
High rise	H-H%	Change the floor
Low	L-L%	Change the floor
Plateau	H-L%	Hold the floor
Low rise	L-H%	Hold the floor
Partial fall	p (L-L%)	Hold the floor

In Pierrehumbert's (1980) model, according to the influence of the pitch accent and phrase accent in the intonation group, boundary tones have five forms: high rise (symbolized by H-H%), low (by L-L%), plateau (by H-L%), low rise (L-H%), and partial fall (p (L-L%). In Pierrehumbert's model, there wasn't a symbol for partial fall. The present author coined a symbol "p (L-L%)" for partial fall ("p" is the abbreviation of "partial").

Low (L-L%): for a full intonation phrase with a L pitch accent ending its final intermediate phrase and a L% boundary tone falling to a point low in the speaker's range, as in the "declarative" contour. It is identified by a fall which ends at the bottom of the speaker's range. This is full fall, which has typically been considered a final intonation and the end of a turn. Therefore, it is likely to be a turn yielding cue.

Low rise (L-H%): for a full intonation phrase with a L phrase accent closing the last intermediate phrase, followed by a H boundary tone, as in "continuation rise". It is identified by a rise which had an upward slope, with lower pitch between the final pitch accent of the contour and its end, and it is usually used in a mid-utterance position to indicate continuation and therefore likely to be a turn keeping cue.

High rise (H-H%): for an intonation phrase with a final intermediate phrase ending in an H phrase accent and a subsequent H boundary tone. It is identified by a rise, which began on the final pitch

accent of the intonation phrase and continued to rise even further until the end, and this is often associated with yes-no questions and therefore likely to be a turn yielding cue.

Plateau (H-L%): for an intonation phrase in which the H phrase accent of the final intermediate phrase upsteps the L% to a value in the middle of the speaker's range, producing a final level "plateau". It is identified as having a level shape extending horizontally from the final pitch accent from the utterance. This boundary is generally longer than any of the other boundaries, which has been recognized as a listing intonation (Pierrehumbert & Hirschberg, 1990). Therefore, it is likely to be a turn keeping cue.

Partial fall (p (L-L%)): it is identified by a fall which was a downward sloping pitch accent of the contour that subsides before reaching the bottom of the speaker's range. It is described as one of a number of intonation boundaries that conveys "more to come" (Chafe, 1988, p. 9). Therefore, it is likely to be a turn keeping cue.

In order to answer the two research questions, the measurement of boundary tones is carried out in two aspects. One aspect is comparing the relationship between five boundary tones and their probability of turn shift in Chinese learners' conversations with that in English native speakers' conversations. The other is to compare the use of five boundary tones as turn keeping cues in Chinese EFL learners' corpus with that in English native speakers' conversations. Through these comparisons, the similarities or differences of using boundary tones between Chinese learners and English natives are found.

3. Method

3.1 Corpus

The subjects for this study consist of 64 sophomores chosen at random in the School of Foreign Studies in Jiangsu Normal University, Jiangsu Province, China. All of them major in English.

The subjects are divided into 16 groups (4 students/group). Each group of subjects was asked to carry out a discussion on a given topic. All of their discussions were recorded. Before recording, each group was given 2 minutes for preparation. They were only informed that the recording would be used for doing research, and they had no idea about the details of this research.

The following is the reason for choosing the style of discussion in this study. Most research studying the relationship of turn-taking and prosody are of a "restricted kind", for example, the conversations between doctor and patient, teacher and students, or between the various speakers in court cases, and interview programs, etc. Roach (2000) claims, despite the existence of difficulties, other forms of conversations are likely to be analyzed in turn taking. Responding to this claim, the present research analyzed the spontaneous discussion among students, and focused on their interaction during the process of turn-taking.

The topic for discussion is, "Should we promote the use of private cars in China? If you can afford it, will you buy one? Why or why not?" There are two reasons for the decision on this topic. One is that buying cars is a fashionable topic in China at present. The subjects are interested in talking about it.

The other is that the intermediate difficulty of this topic makes it possible for the subjects to carry out the discussions successfully.

All of the recording process was carried out in a phonetic lab in the Jiangsu Normal University. Four head-mounted microphones, four computers, and the software Cool Edit Pro 2.0 have been used for recording (The parameters in Cool Edit have been set as 44100HZ, 16, single track).

Each student in the group wore one head-mounted microphone, which was connected to a computer for recording their voices (four computers and four microphones for each group). All the computers were put behind the subjects in order to avoid disturbance. Four trained recorders (the author and three assistants) were in charge of four computers respectively. The data collection was taken on two weekends in the last week of April and the beginning week of May in 2020.

During the course of discussions, nobody interrupted the subjects. They discussed the given topic freely. The discussions ended whenever subjects wanted to stop. The recording time for each group was less than 10 minutes. When the discussions were longer than 10 minutes, they were stopped by the recorder. Through the first filtration, 70 minutes' recording of 10 groups was chosen as the corpus for further annotation.

3.2 Data Annotation

The entire corpus was transcribed on the software Praat 6.2. Moreover, the Tone and Break Index (ToBI) system (Beckman & Ayers, 1997) was used with some modifications for describing the key variables of this study in more detail. Furthermore, the well-founded rules have been taken as the criteria to analyze the complicated spontaneous corpus, including rules of defining the minimal analysis units and the rules of identification of turns in spontaneous conversations.

3.2.1 Minimal Analysis Units: IPU

Some researchers choose the turn units or complete grammatical units as the minimal analysis units. But they are not suitable for the present research. The reasons are: 1) turn units are too general. If the minimal analysis unit is chosen as one turn in the present research, the relationship between turn units will become prominent while the features within one turn can not be described. Thus, the use of intonation features will not be depicted thoroughly; 2) the present research focuses on the relationship between prosodic features and turn-taking instead of the grammatical factors in turn-taking. Choosing grammatical unit as the minimal analysis unit will make the investigation more complicated and will divert the researching focus.

Koiso et al. (1998) utilized Inter-Pausal Units (IPUs) as the minimal analysis units in the research of intonation roles in the turn taking in Japanese. Inter-Pausal Unit is the stretch of a single speaker's speech bounded by pauses longer than 100 ms and it is used as an approximation of the notion of TCU. Casper (2003) also employed this unit in studying local speech melody in turn taking system in Dutch. These IPU are adopted in present study for four reasons: 1) these units can be determined objectively; 2) one IPU is not larger than one turn. IPU may occur within turns or at turn transitions. Thus, the

prosodic features can be described in detail by cutting the corpus into small IPUs; 3) these units eliminate syntactic disturbances, and make the role of intonation prominent; 4) there is evidence for the decision on intervals of 100 milliseconds. Hieke et al. (1983) point out that a pause which is not shorter than .13 sec has psychological relevance. Wennerstrom et al. (2003) point out: “pauses were considered any length of time of .1 sec and up where there was no speech-related amplitude” (p.86).

3.2.2 Identification of Turns in Spontaneous Conversations

Spontaneous speech is dynamic yet complex. The complexity mainly exist in the occurrence of conversation features such as repair, back-channel, overlapping, interruptions, which happen frequently in spontaneous conversations. It is necessary to identify these conversational features as one turn or more than one turn. The present research adopted the principles of Caspers (2003) for judgment.

Figure 1 shows Caspers’ (2003, p. 261) methods, in which “hold” means that the same speaker continues after a pause of 100 ms or more, while “change” means that a turn change has happened, with or without an intervening pause.

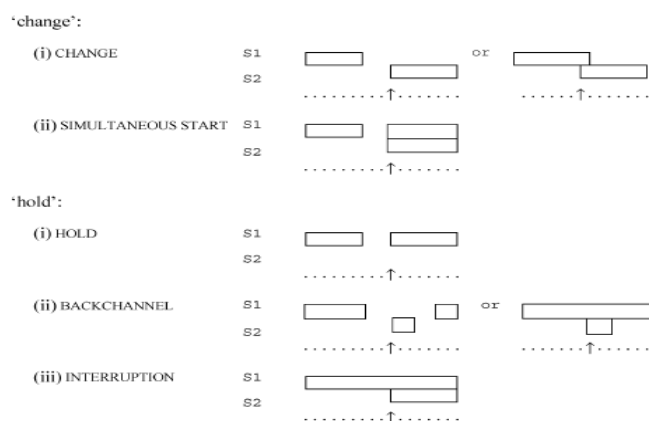


Figure 1. Schematic Representation of the Five Turn Transition Types

Figure 1 The boxes following S1 depict stretches of speech uttered by speaker 1, S2 indicates the speech by speaker 2, the dotted line marks the time course, and the arrow indicates the relevant IPU boundary.

3.2.3 Tiers on Praat

The data was cut into 2404 IPUs, and presented by 532 interfaces in Praat, each of which was not longer than 20 seconds. Every interface of Praat was labeled by five tiers.

Pause tier: Pauses longer than 100ms were labeled in this tier, and the IPUs bounded by the pauses were identified.

Orthographic tier: What the subjects talked was transcribed word by word in this tier.

Boundary tone tier: Boundary tone of the last intonation group at the end of every IPU was labeled in this tier.

Lengthening tier: Duration of final syllable of every IPU was labeled at the end of every IPU in this tier.

Transition type tier: the transition type was labeled at the end of every IPU in this tier according to the principles in Figure 1 (“C” for change, and “H” for hold).

All of the annotation work has been accomplished by the present author. There are three reasons for the validity of this work. Firstly, detailed and objective criteria were available in the annotation of every variable. Secondly, consistency in annotation was kept by a single transcriber. Thirdly, in order to guarantee the accuracy in transcription, the wideband spectrograms were used for reference in the course of annotation and the annotated data has been checked four times.

Figure 2 is an example of the annotation on Praat.

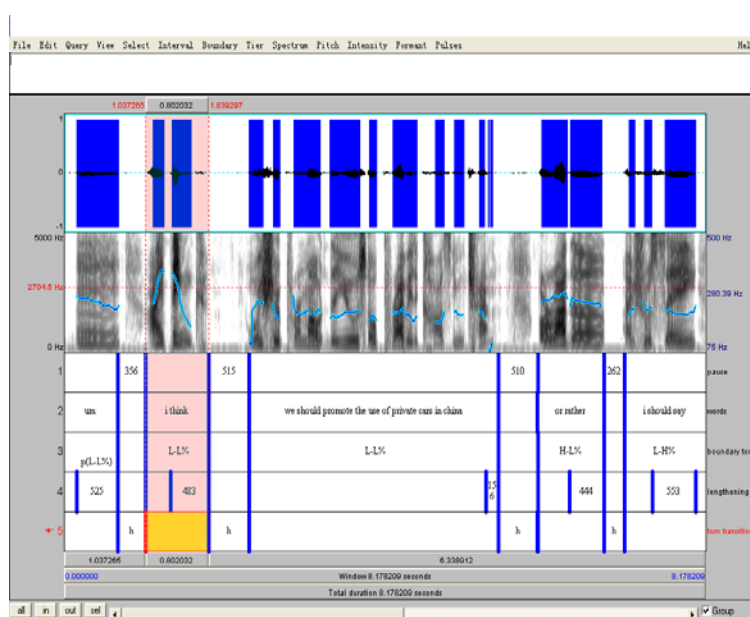


Figure 2. One Example of Annotation

Therefore, based on the data extracted by Praat, the measurement of boundary tones was undertaken in two aspects. From the perspective of turn changing, the relationship between five boundary tones and the probability of turn shift was measured in the recorded Chinese learners' conversations. From the perspective of turn keeping, the distribution of five boundary tones in turn keeping was computed in Chinese EFL learners' conversations. The results of the measurements in these two aspects were compared with the use of English natives. Through these comparisons, the similarities or differences of using boundary tones in turn taking between Chinese learners and English natives were found.

4. Results and Discussions

4.1 Boundary Tones' Probabilities of Turn Shift and their Distribution in Turn Keeping

Figure 3 shows the probabilities of turn shift for five boundary tones. It is easy to find that high-rise boundary tone is the most likely to coincide with turn shift (by 45%), followed by low boundary tone (by 26%). The next three are low rise (by 9%), partial fall (by 3%), and plateau (by 3%). The difference in probabilities of turn-shift for five boundary tones is statistically significant ($\chi^2=199.544$, $P<0.01$).

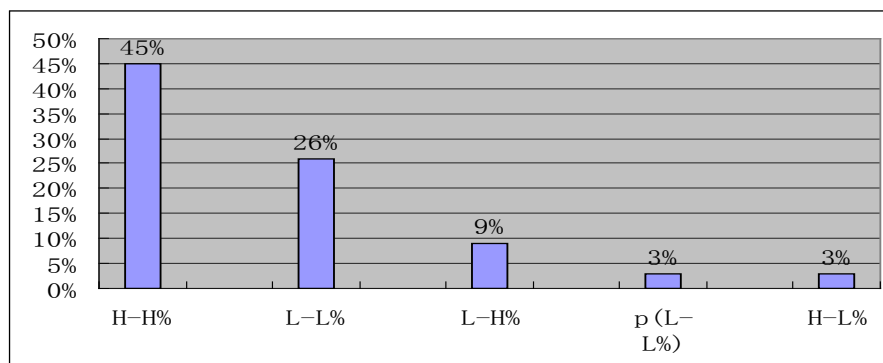


Figure 3. Five Boundary Tones and their Probabilities of Turn Shift

These results of boundary tones used by Chinese learners are compared with those findings of boundary tones used by English natives according to Wennerstrom et al.'s (2003) research. This comparison is valid. Wennerstrom et al. (2003) have accomplished research on the use of five boundary tones in English native's conversations by using two audiotaped informal spontaneous conversations among different groups of their friends. The validity of the comparison in terms of boundary tones between this research and Wennerstrom et al.'s (2003) study exists mainly in following reasons: 1) both researches use spontaneous conversations. By using spontaneous speeches, the use of turn-taking cues can be investigated in real time, for example, how the speakers perceive and interpret their turn-taking signals can be studied through their spontaneous turn-by-turn responses. 2) both of the researches use the conversational form of chat. By using this form, speakers in one group express their own opinions freely by the natural control of turns without considering the factors required in formal discussions, such as the priority of speaking according to social status, special order of speaking according to the requirements of formal meetings, and so on.

Through the comparison, it is found that 1) the number of boundary tone types used at the position of turn-shift is five in Chinese learners' conversations, which is the same with the use of English native speakers; 2) the sequence of the probabilities in turn changing from highest to lowest is high rise H-H%, low L-L%, low rise L-H%, partial fall p(L-L%), plateau H-L%. This sequence is similar to that of the English natives. 3) However, for individual boundary tones, the probability of turn-shift in Chinese learners' conversations is much lower than that in English native speakers' (the probabilities of turn

shift in English native speakers' conversations for five boundary tones are: 67% for high rise H-H%, 40% for low L-L%, and about 10% for other three boundary tones including low rise L-H%, partial fall p (L-L%), and plateau H-L%. Wennerstrom et al., 2003, p. 91).

This difference indicates that boundary tones are not used sufficiently in turn changing in Chinese learners' conversations. In other words, Chinese learners can't make good use of boundary tones to show their intentions of turn yielding.

As is known, using boundary tones for organizing turn taking is one of the conversation strategies or skills. The insufficiency in using boundary tones in turn yielding reveals Chinese EFL learners' weakness in using conversation strategies. This finding is consistent with that of Wei's (2004) research, through which he points out the weakness of Chinese EFL learners in using conversation strategies for general arrangements of conversations.

Deficiency in the knowledge of boundary tones and their functions in English conversations may have caused this insufficiency. If Chinese learners haven't the ideas about the functions of boundary tones in turn-taking, they are not able to use them appropriately and sufficiently. Therefore, it is suggested that in SLA, Chinese learners should increase the knowledge of boundary tones especially in their functions of conversational organization; learners should practice how to use boundary tones to arrange turn-taking in order to guarantee the efficiency of their conversations.

Figure4 shows the distribution of five boundary tones used in turn keeping. It is obvious that the percentage of low boundary (29%) is higher than other types: low rise 26%, partial fall 27%, and plateau 17%.

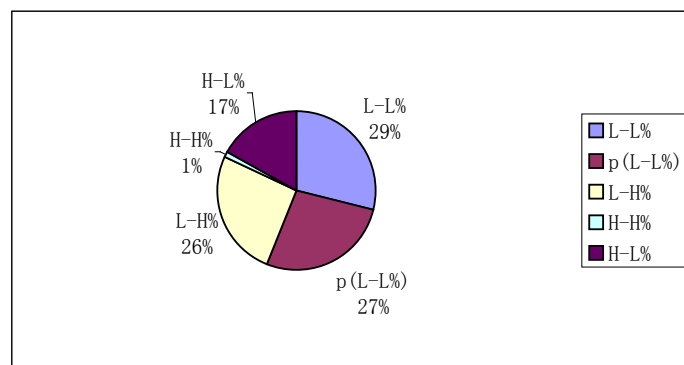


Figure 4. The Percentages of Five Boundary Tones in Turn Keeping

According to the functions of boundary tones reviewed in section II, low boundary tones (L-L%) imply the speakers' intention of ending the current turn. However, as Figure4 shows, they are used in turn keeping by Chinese learners, and their percentage is much higher than that of other boundary tones. This indicates that the misuse of low boundary tones is serious. The low boundary tones imply the turn finality, and will arouse the listeners' reactions; when listeners take actions to accept the turns, the

speakers actually wouldn't give up the turn according to their real intentions; thus, the misuses of low boundary tones against the speakers' real intentions will easily cause the disharmony between two interlocutors. Therefore, the frequent use of the low boundary tone when the turn is to be held can easily result in misunderstandings, the frequent interruption, the disorder in organizing talks, or even complete breakdown of communication.

This finding is consistent with that of Chen's study (2006): the intonation of Low drop has been overused by Chinese learners. It is also similar to the finding of Davies and Tyler's (1994) research that the mistakes in using prosodic features cause unsuccessful conversations in the research of dialogues between American students and Chinese teachers. Gumperz (1992) finds that the misuse of low boundary tone in conversations is also prominent in Indian EFL students' conversations. Wennerstrom (2001, p. 237) draws a more general conclusion through her studies: there exists "...a higher use of low pitch boundaries at connective junctures among nonnative speakers from Thai, Japanese, Indonesian, Korean, and Greek language backgrounds".

The misuse of low boundary tones in turn keeping may have been caused by negative L1 transfer. Three kinds of differences between Chinese and English are concerned with the misuse of boundary tones.

The first one is the difference in the distribution of low boundary tones in declarative sentences between Chinese and English. Zhang's (2003, p. 15) study focused on boundary tones' distribution in the comparative study of Mandarin and English declarative corpora. She finds that low boundary tone occurs at Mandarin declarative sentences' boundaries with absolute domination while two types of boundary tones (i.e., L% and H%) occur at the English declarative sentences boundaries. It is clear that the high distribution of low boundary tones in Chinese may have the negative influence on their use in English.

The second is the difference in intonation distribution on the sentence between Chinese and English. In tone languages, the lexical tones are remained in intonation. Chao (1968) compares lexical tone and intonation in Chinese to "small ripples riding on larger waves". That is, intonation affects the overall register, but the lexical tones retain their relative pitches and shapes and are mapped on to this register "wave". Contrarily, in intonation language, as Yip (2002, p. 261) points out, individual lexical tones may be substituted, and boundary tones associating with heads and edges may completely determine the pitch contour of an utterance.

In EFL learners' conversations, Chinese learners have the tendency to treat English words in the similar pattern as they speak Chinese. In other words, the lexical tones of English words are kept in the intonation of a sentence. Generally speaking, the lexical tone in English always ends with low boundary tones, for it is not necessary to consider the connection between words or the influence of sentence intonation when they appear independently. Thus, in Chinese EFL learners' English conversations, the sentence component words may end with low boundary tones.

The third one is the difference in the connection style between Chinese and English. In Chinese, intervals appear among words/syllables in one sentence, while in English, all the syllables/words are connected end to end, and there are no obvious divisions between them (Wan, 2004, p. 176). Chinese learners deal with the connection of individual English words in the way they do in speaking Chinese. In other words, intervals appear frequently among English words in Chinese learners' conversations. These separated English lexical items are likely pronounced with the lexical tones and end with low boundary tones when they appear independently. They are not connected with each other by the continuous pitch style as English natives do in English conversations.

All these differences related to L1 transfer probably have exerted the negative influence on Chinese learners, and make them use unconsciously the low boundary tones within one turn, only to give listeners the impressions of disfluency and the wrong signal of turn yielding.

4.2 The Misuses of Low Boundary Tone and their Distribution

The analysis above points out one striking tendency in the use of boundary tones to signal turn holding: the high-rate of misuses in low boundary tones. This phenomenon is then further studied and classified to show the true picture. As a result, nine different types of misuses are found and interpreted by typical examples illustrated by figures from Praat, in which the blue lines refer to the pitch ranging from -12 semitones to 30 semitones, the minimal analysis units (IPU) are bounded by pauses longer than 100 milliseconds, and words correspond to the pitches indicated by the blue lines.

1) Misuses of low boundary tones between the continuous sentences in one turn

The continuous sentences in one turn should be connected by the turn-holding cues. However, in Chinese learners' conversations, low boundary tones are used between the continuous sentences. Figure 5 exhibits one example of this kind of misuse.

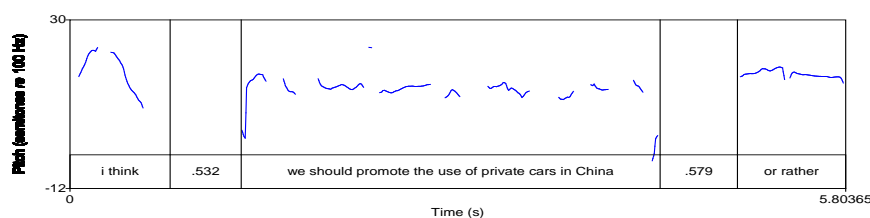


Figure 5. Misuse between Continuous Sentences in One Turn

In Figure 5, “we should promote the use of private cars in China” is a complete sentence in grammar. The integrity in grammar does not mean the end of a turn. In the recorded corpus, there are sentences following this one, which means that the speaker doesn't intend to give up the turn. But at this non-final turn position, the low boundary is used at the end of “China”. This kind of error is also pointed out by Chen (2006, p. 424): in Chinese learners' conversations, the misuses of the intonation of low drop happen between the paratactic sentences.

2) Misuses of low boundary tones between main clauses and their post positioned modifications

Although the main clauses are intact in grammar, when some attributive and adverbial modifiers are post positioned, the end of main clauses doesn't mean the end of a turn. So the low boundary tones used at the end of main clauses obviously separate the main clauses from their post positioned modifiers, and imply wrongly the finality of the turn to listeners. Figure6 exhibits one example of this kind of misuse.

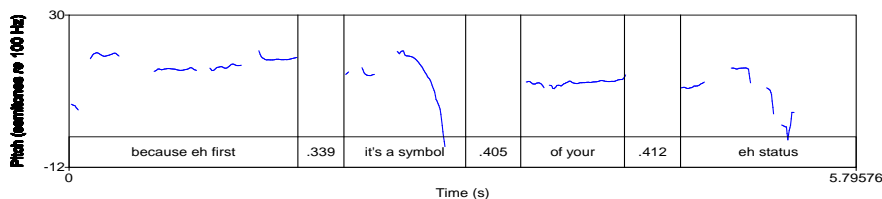


Figure 6. Misuse between Main Clauses and their Modifications

In Figure 6, the pitch falling to the baseline shows that the low boundary tone is used at the end of the phrase, “it’s a symbol”. It is used at the end of the main clause, and separates this phrase from the post-positioned attributive modifier.

3) Misuses of low boundary tones at the end of sense groups bounded by pause

These sense groups are the sentence components bounded by pause in Chinese learners’ conversations. They may be the major components of a sentence, such as subjects, predicate, objects, attributes, verbal phrases, and so on; they are probably the parts of these major components; sometimes they might be those separated words spoken during the course of thinking, which have no relation to the former or latter sentences, and then probably are corrected. All of these sense groups long or short are clearly in one turn, but low boundary tones are used at the end of these groups. Figure 7 exhibits one example of this kind of misuse.

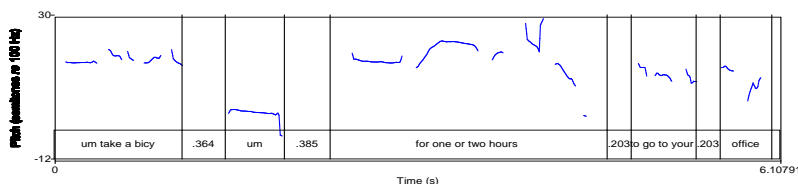


Figure 7. Misuse at the End of Sense Groups bounded by Pause

In Figure 7, “for one or two hours” is an adverbial modifier. This sense group exists within a turn, but the low boundary is used at the end of “hours”.

4) Misuses of low boundary tones at the end of emphasized parts

The emphasized parts are components of sentences, and they are in one turn. Using low boundary tones at the end of these parts is not appropriate. Figure 8 exhibits one example of this kind of misuse.

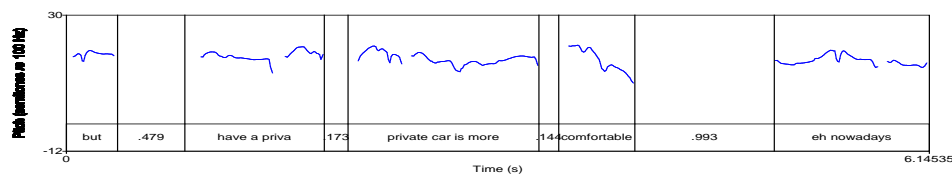


Figure 8. Misuse at the End of Emphasized Parts

In Figure 8, from the great intensity, the subsequent pause, and the large change in pitch used in “comfortable”, it is easy to tell that this word is emphasized. It is still in the turn, but low boundary tone is used at the end of this word.

5) Misuses of low boundary tones at the end of yes-no questions

Yes-no questions are often associated with High rise (H-H%), but in Chinese learners conversations, there are some misuses of low boundary tones at the end of these kind of questions. Figure 9 exhibits one example of this kind of misuse.

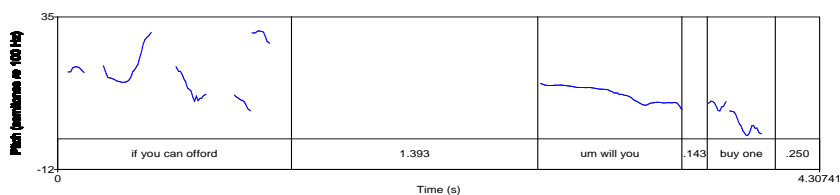


Figure 9. Misuse at the End of Yes-no Questions

In Figure 9, “will you buy one?” is a yes-no question, which should end with high-rise boundary tone. But actually, the pitch of “one” shows that it ends with low boundary tone. This error is also pointed out by Chen (2006, p. 424): the misuses of the intonation of low drop also happen at the end of yes-no questions in Chinese EFL learners’ questions.

6) Misuses of low boundary tones at the end of Conversation Fillers

The Conversation Fillers such as eh, um, and, the, how to say, etc. appear within one turn to fill the intervals of thinking in conversations (Wei, 2004). The low boundary tones can’t be used at the end of these fillers. Figure10 exhibits one example of this kind of misuse.

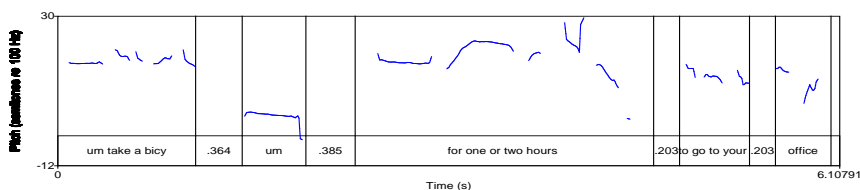


Figure 10. Misuse at the End of Conversation Fillers

7) Misuses of low boundary tones at the end of extracted substantives or phrases.

When some difficulties or delay happen during the process of substantive or phrases extraction, Chinese learners probably use low boundary tones at the end of these extracted substantives. The words or phrases extracted are still in one turn. So the use of low boundary tones at the end of the extracted substantives or phrases is not correct. Figure 11 exhibits one example of this kind of misuse.

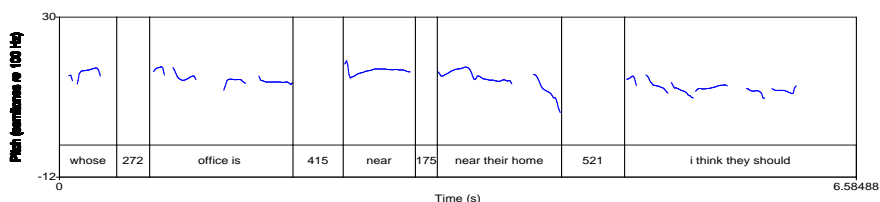


Figure 11. Misuse at the End of Extracted Substantives or Phrases

In Figure 11, the repetition of “near” shows that delay appears in the retrieving of the phrase “near their home”. It is not correct that this extracted phrase ends with low boundary tone, because it is still in a turn.

8) Misuses of low boundary tones at the end of repairing words or phrases

Repaired words or phrases are in one turn. Low boundary tones can't be used at the end of these parts. Figure 12 exhibits one example of this kind of misuse.

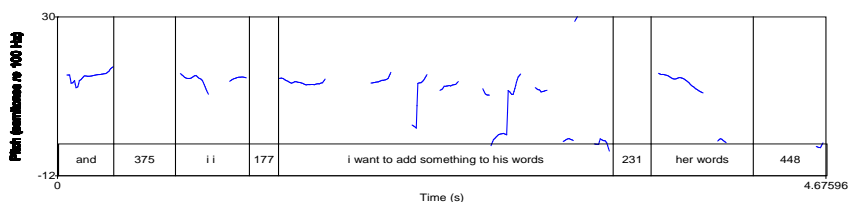


Figure 12. Misuse at the End of Repairing Words or Phrases

In Figure 12, “his words” is repaired to “her words”. This repairing phrase, “her words” is still in one turn, so the low boundary tone used at the end of this phrase is not appropriate.

9) Misuses of low boundary tones caused by the mispronunciations

Figure 13 exhibits one example of this kind of misuse.

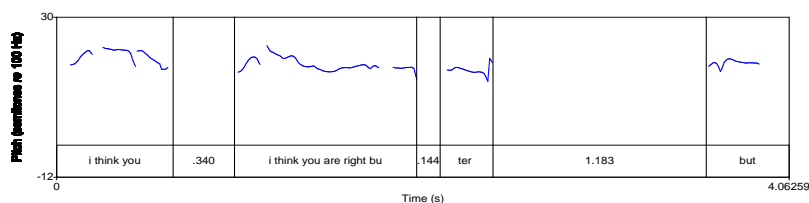


Figure 13. Misuse Caused by the Mispronunciations

In Figure 13, the mispronounced “bu ter” ends with low boundary tone, while it is still in one turn.

These nine kinds of misused low boundary tones are presented above. The following section reports their distribution in Chinese EFL learners’ conversations.

Figure 14 shows the distribution of 9 kinds of misused low boundary tones. It is easy to find that the occurrence of the third kind of misuse is the most frequent (48%). The frequency of the third type is much higher than that of the first type (20%) and other types of misuses. According to the 9 categories analyzed above, the third type misuse of low boundary tone happens at the end of sense groups bounded by pause in Chinese learners’ conversations. That is to say, misuses of low boundary tones at the end of these sense groups are the most prominent.

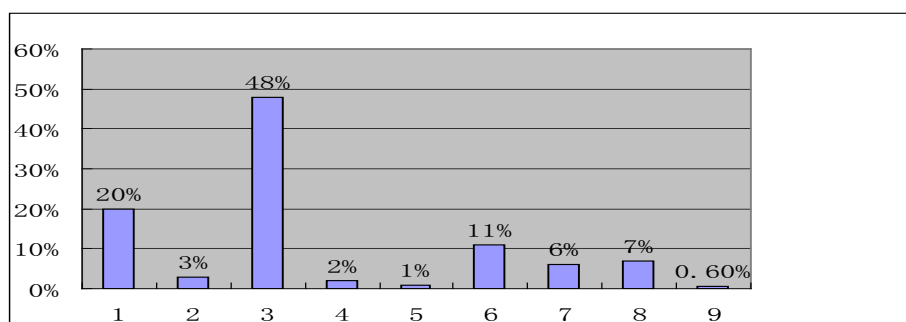


Figure 14. The Distribution of 9 Kinds of Misused Low Boundary Tones

Most of the misuses happen at the end of sense groups bounded by pause in Chinese learners’ conversations. According to the descriptions of 9 kinds misused low boundary tones above, no matter how large the sense groups are in size, they are sentence internal components bounded by pause and still in one turn. It is not appropriate to use low boundary tones at the end of these sentence internal components. Moreover, the frequency (48%) of misuses at the end of these sentence components is much higher than those in other positions. It indicates there is a strong tendency that Chinese learners frequently use low boundary tones to end sentence components bounded by pause, whether these

components are big or small in size.

One of the possible reasons for this tendency is the weakness in language competence. The subjects of the present research are intermediate EFL learners. The deficiency in language competence could cause the highly frequent misuse at the end of sentence components. For instance, the poverty in vocabulary results in the frequent pauses (Mu et al., 2005), which increases the occurrences of sentence components bounded by pause. Thus, the misused low boundary tones most likely happen at the end of these components.

Another possible reason is the psychological influence. When these subjects are equipped with microphones and asked to talk freely in a language lab, they may consciously or unconsciously feel nervous in different degrees. It is nervousness that makes subjects pause more frequently during their speeches.

This is related to the problem of the naturalness of the recorded corpus. It is not easy to collect the corpora which are completely natural in the daily conversations. For satisfying the great needs of researches in the rules of daily conversations or dialogues, sometimes subjects have to enter the language lab, where they are asked to talk freely. The naturalness of these corpora may be influenced by the environments and psychological factors. Actually, purely natural daily conversations are difficult to record. Most of the spontaneous corpora used by researchers are not absolutely natural.

However, the degree of naturalness in recording conversations can be controlled to be close to the absolute authentic interactions through the adjustment of environments and other various factors.

The extent of control depends on the needs of research, that is, the intervening factors remained would not influence the validity of the study's results. For the present research, the place of recording was chosen in a phonetic lab in order to reduce more intervening variables. The psychological influence in this study belongs to the intervening factors. These influences could be some of the reasons for misuses but could not deny the validity of the whole research. Of course, it is admitted that the existence of this intervening factors is one of the limitations of the present research.

4.3 Summary of the Results in Boundary Tone

Though the description of boundary tones used in the process of turn-taking in Chinese EFL learners' conversations, there are following findings: boundary tones used by Chinese learners during the process of turn-taking can be classified into five types, which are similar to the use of English natives; the sequence in probabilities of turn shift for five boundary tones in Chinese learners' conversations from high to low is similar to that in English native speakers'; however, for the individual boundary tone, the probability of turn-shift in Chinese learners' conversations is much lower than that in English native speakers'; the misuse of low boundary tone is the most prominent in turn keeping; this misuse is roughly grouped into 9 categories, in which the misuse of low boundary occurs most frequently at the end of the sense groups bounded by pause in Chinese learners' conversations. All of these features indicate Chinese learners can't make appropriate and efficient use of boundary tones to project turn

taking.

5. Conclusions

5.1 Major Findings

This research aims to accomplish two tasks in answering the two research questions. One is describing Chinese EFL learners' use of boundary tones in turn taking. The other one is comparing Chinese learners' characteristics with that of English natives. The major findings are presented as follows:

In terms of boundary tones, five types of boundary tones used in English can be found in Chinese learners' conversations; the sequence in probabilities of turn shift for five boundary tones in Chinese learners' conversations from high to low is similar to that in English native speakers'; in terms of individual boundary tone, the probability of turn-shift in Chinese learners' conversations is much lower than that of English native speakers; furthermore, in turn-keeping, the misuse of low boundary tone is the most prominent; the misuse is roughly categorized into 9 patterns, among which the misuse of low boundary occurs most frequently at the end of the sense groups bounded by pause in Chinese learners' conversations. All of these features indicate Chinese learners can't make appropriate and efficient use of boundary tones to project turn taking.

5.2 Limitations of this Study and Suggestions for further Research

Naturally, the studies into intonation do not stop at boundary tones, and Chinese EFL learners' use of prosodic features in turn taking can't be covered only by 64 subjects' discussions. It is hoped that other intonation features such as rhythm, key shift, etc., will be researched, and the number of subjects would be enlarged in the future studies.

Moreover, although some similarities and differences between Chinese learners and English natives are found out in the use of intonation features, the reasons causing the differences are not analyzed systematically. One would also like to study these reasons from cognitive, physiological and other perspectives.

Additionally, this study puts emphasis on the speakers' production activity in turn taking. Future studies would turn to the perceptual side and see profoundly how the listeners perceive and identify the prosodic cues in turn taking.

In summary, in order to investigate thoroughly Chinese learners' use of prosodic features in the process of turn taking and to explore systematically the reasons for differences between Chinese learners and English natives, a great number of researches are expected.

It is hoped that through the investigation into Chinese EFL learners' use of prosodic features in conversation organization, one can obtain a better understanding of the supra-segmental aspect of Chinese learners' interlanguage. It is also hoped that more prosodic and conversational studies in SLA are made available in order to depict language acquisition process in more detail and provide more references to language acquisition and teaching.

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