

English Rhythmic Structure and Tone-Units Perception by the Speakers of Chinese

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Abstract

The present paper deals with the peculiarities of English rhythmic structure and tone-units perception by the speakers of Chinese. The prognosis is made that it is bound to be problematic for the China English speakers to identify the analogous rhythmic structures in the phrases of different syntactic organization. Consequently, misperception of English rhythmic structures may lead to further resegmentation within the English phrase of a complex syntactic structure. The experiment has been conducted to prove this prognosis.

1. Introduction

In the situation of language contact there occur a number of processes of linguistic interaction. These processes are traditionally viewed as language transfer, which affects the whole hierarchy of the language system. A number of studies have been carried out to investigate the transfer of L1 prosodic patterns into English [1, 2, 3, 4, 5, etc.]. However, there are still areas that need further research.

Traditionally, the phonological phenomena have been treated as being isomorphic both productively and perceptively. With the surge of interest to the linguistic situation in the globalizing world, and the emerging paradigm of World Englishes, another parallel has been drawn, namely, with second/foreign language acquisition. It is assumed that the China English speakers are likely to have problems identifying the analogous rhythmic structures in the phrases of different syntactic organization. This may lead to further resegmentation within the English phrase of a more complex syntactic structure.

2. Method

2.1 Participants

Two native speakers of General American English (male and female), 30-35 years old, were recorded as they read samples of English phrases. Forty Chinese students (ages 20-30) majoring in English (Dalian Institute of Foreign Languages and School of Foreign Languages, Harbin Institute of Technology), participated in the English speech perception test.

2.2 Materials and recording

The recordings were made with the help of Olympus DS-20 digital voice recorder. The total duration of experimental material is 30 minutes. 42 sample phrases of different structural complexity were further acoustically analyzed with Praat (Version 5.0.05).

2.3 Procedure

Stage 1: 11 pairs of simple English phrases containing analogous rhythmic structures were played to the listeners through the loudspeakers in a quiet room. The subjects were provided with written versions of the perception test material. The syllable division of the sample phrases was done beforehand to facilitate the process of perception (e.g: *They've/ ar/rived.*). The listeners were asked to mark the accented syllables with (+).

Stage 2: 20 complex English phrases were played to the subjects who were provided with written versions of the perception test material. They were given a task to mark with (|) the tone-unit boundaries while listening.

3. Results and discussion

The experiment on rhythmic structures and tone-units perception by China English speakers has revealed the results, presented in the following tables.

Phrase	Rhythmic structure	Models of Rhythmic Structure Perception %					
1.	+	+					
Wait!	1/1	100					
Look!	1/1	100					
2.	-+	-+		++		+-	
Begin!	2/1	88		12		-	
She talked.	2/1	58		36		6	
3.	++	++		-+		+-	
Don't stop.	1/1,1/1	65		6		29	
Who cares?	1/1,1/1	36		52		12	
4.	++-	++-		-+-		+--	
Keep quiet!	1/1, 2/1	36		58		6	
Don't worry!	1/1, 2/1	76		6		18	
5.	+++	+++		+--		--+	
Don't forget!	2/1,1/1	47		18		29	
What's the time?	2/1,1/1	58		6		36	
6.	-+-	-+-		++-		--+	
I've seen it.	3/2	76		24		-	
They've finished.	3/2	64		18		18	
7.	--+	--+		+-+		-+-	
I insist.	3/3	71		17		6	
They've arrived.	3/3	76		12		-	
8.	+++	+++		+---		-+-	
What do you want?	3/1, 1/1	36		52		6	
Where was he from?	3/1, 1/1	41		18		29	
9.	+-+	+-+		+---		---+	
See you later!	2/1, 2/1	41		35		18	
Come and see us!	2/1, 2/1	47		35		6	
10.	-+-	-+-		+--		-+-	
I spoke to John.	3/2, 1/1	47		41		6	
He wants to come.	3/2, 1/1	58		18		-	
11.	-+-	-+-		+---		---+	
I can't believe it.	2/2, 3/2	29		12		41	
She tried to call you.	2/2, 3/2	41		29		24	

Table 1: English Rhythmic Structures Perception by China English speakers

Table 1 demonstrates that simple English phrases similarly arranged in terms of rhythmic structure but being syntactically different have not always been perceived as such by the speakers of Chinese. This can be explained by the discrepancy of rhythmic organization codes in English and Chinese. Most frequently the rhythmic structures containing accented pronouns or/and auxiliary verb-predicates have been declared. The key factor affecting the perception of an English word as accented is its position in a phrase. Given that there is a tendency of distinct prosodic marking of the initial part of the phrase in Chinese, the first word in the English phrase has often been perceived as prominent. Besides, the prosodic transfer of the Chinese tendency to accumulate the stress by the end of the phrase took place, which resulted in frequent identifying the final word in the English phrase as accented. Prosodic features of English vowel duration have been taken by Chinese as indicators of accented syllables in a phrase, due to the fact that duration is a major means of achieving prominence at a phrasal level in Chinese.

Sentence Type	Correct perception	Incorrect Perception		
		Total	Minus-segmentation	Plus-segmentation
2 tone-unit phrases	74%	26%	0%	26%
3 tone-unit phrases	32%	68%	51%	17%
4 tone-unit phrases	16%	84%	68%	16%
5 tone-unit phrases	11%	89%	82%	7%
6 tone-unit phrases	5%	95%	89%	6%

Table 2: Tone-Unit Perception of the English Phrase by China English Speakers

Prosodic and syntactic markers are considered to be the most significant for speech segmentation. Pause - a break in phonation (physical pause) - is viewed as the most powerful means of phrasing. There are also instances when there is no break in phonation but listeners still perceive the boundary relying on other prosodic boundary markers such as positive, negative and zero frequency intervals, last syllable duration etc (psychological pause).

According to Table 2, 74% of subjects have divided the sentences comprising two meaningful groups correctly mainly because the prosodic boundaries coincided with the syntactic ones. This is a case of a grammatical pause ranging from 70 to 571 ms in American speaker's production. Example:

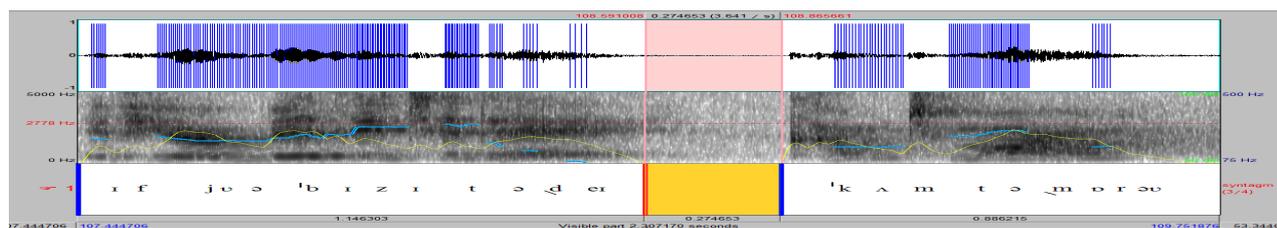


Figure 1: Complex sentence: *If you're busy today, come tomorrow.*

Correct	Incorrect
1. Arriving back / they found Ann in the sitting room / reading magazines.	1. Arriving back / they found Ann in the sitting room reading magazines.
2. The knife / he had cut himself with / had a rusty blade.	2. The knife he had cut himself with / had a rusty blade.
3. In the evening / they caught some fish / eating part of it / and saving the rest / for breakfast.	3. In the evening / they caught some fish eating part of it and saving the rest for the breakfast.
4. During festivals, / holidays / and celebrations / certain traditions are observed in England.	4. During festivals, holidays and celebrations / certain traditions are observed in England.

Table 3: Minus-Segmentation Cases in the Perception of the English Phrase by China English Speakers

Correct	Incorrect
1. I shall help you next week / when my exams are over.	1. I shall help you / next week / when my exams / are over.
2. Mary / come to the blackboard.	2. Mary / come to / the blackboard.
3. I live in a cottage / in the north of England.	3. I live in / a cottage / in the north / of England.
4. The age difference between them / is only two years.	4. The age / difference / between them / is only two years.

Table 4: Plus-Segmentation Cases in the Perception of the English Phrase by China English Speakers

Table 3 and Table 4 demonstrate that the more complex the structure of the English phrase is, the more often the transfer phenomena from Chinese into English occur. Firstly, the discrepancies in rhythmic structure organization in both languages (Chinese being syllable-timed while English - stress-timed) affect the perception. Chinese prosodic structure is organized hierarchically: syllable - foot (prosodic word) - prosodic phrase. Every segment is followed by a pause which differs in length [6]. Bisyllabic rhythmic pattern constitutes the minimal tone-unit for the Chinese speech and four syllable rhythmic pattern is the maximum one [7]. This feature has led to plus-segmentation in tone-unit perception of the English phrase by Chinese listeners. Moreover, Chinese tonal syllables may impede the perception of English pitch resets. Chinese syllable tones are expressed acoustically in pitch trajectories (different tones show different pitch value ranges and trajectory patterns) [8]. As a result Chinese subjects' perception of tone-unit boundaries may be complicated under the influence of Chinese pitch patterns which can also lead to plus-segmentation. The listeners being disoriented by English pitch movements relied on typical Chinese bisyllabic (three or four-syllabic) rhythmic patterns in the process of phrasing [9, 4]. The cases of minus-segmentation are more difficult to explain. Since the Chinese pause more often and rely on their rhythmic and pitch patterns they could have defined more tone-units within a complex English phrase. However, there occurred quite an opposite situation: the longer the phrase was, the fewer tone-units they defined (See Table 2). These cases need further explanations; presumably, they can be related to syntactic and prosodic discrepancies between English and Chinese language systems.

Prosodic Boundary Markers				
Pause	Positive Frequency Interval	Final Syllable Lengthening	Negative Frequency Interval	Zero Frequency Interval
87%	76%	61%	37%	29%

Table 5: Frequency of Recognizing Prosodic Boundary Markers by China English Speakers

Table 5 reflects the findings on phrasing the complex English sentences in the aspect of the reliance on various prosodic boundary markers. According to the data acquired **physical pause** is the most valid prosodic boundary marker (87%). Pause duration in the recorded material ranged in length as follows: short pauses - 70 - 200 ms; medium pauses - 200 - 400 ms; long pauses - 400 - 600 ms. Physical pause duration was irrelevant to the listeners. **Final syllable**

lengthening also proved to be significant as an intra-phrase boundary marker for the Chinese listeners (61%). It may be explained by positive transfer of the Chinese syllable prosody rules into English speech patterns. A Chinese syllable bearing syntagmatic/phrasal prominence is described as being longer than other syllables in a tone-unit/phrase and tends to be at the end of the tone-unit/phrase. Consequently, final syllable lengthening by the American speaker was perceived rather successfully by the Chinese listeners. Reliance on **positive frequency interval** (76%) may be attributed to the similarity of prosodic boundary organization in both languages where pitch reset is employed as an intra-phrase boundary marker [6]. **Negative and zero frequency intervals** were not valid for the Chinese listeners (37% и 29% correspondingly). They impeded the boundary perception by the Chinese subjects. This occurred, presumably, due to the fact that such English pitch movements were difficult for the Chinese listeners to perceive because of Chinese tonal features.

4. Conclusion

Problems of analogous rhythmic structure perception by the speakers of Chinese can be explained by the discrepancy of rhythmic organization codes in English and Chinese. It is typical for China English speakers to interpret pronouns or/and auxiliary verb-predicates as accented. The key factor affecting the perception of an English word as accented is its position in a phrase due to the tendency of distinct prosodic marking of the initial and final parts of the Chinese phrase. Prosodic features of English vowel duration are often taken by Chinese as indicators of an accented syllable in a phrase. The process of English boundary perception by China English listeners is characterized by resegmentation phenomena as a result of negative transfer of Chinese prosodic patterns into English ones. Two tone-unit phrases present less difficulty to China English listeners provided the intra-phrase boundary is marked by a physical pause and pitch reset at a syntactic boundary. The structural lengthening of the English phrase leads to the incorrect perception of boundary segmentation within the phrase, in most cases - to minus-segmentation. The most relevant boundary markers for the Chinese listeners are final syllable lengthening, positive frequency interval, and physical pauses. Correct boundary segmentation is associated with a syntactic structure of the utterance. The problematic areas of English boundary segmentation for the China English listeners include: recognizing negative and zero frequency intervals at the tone-unit boundaries, as well as structural complexity of the English phrase.

The above data need further analyzing, which will allow getting more profound results*.

5. References

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