Phonetics of Speech Acts: A Pilot Study

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Abstract

This paper aims to investigate the effect of speech act and tone on rhythm. Participants were asked to produce four sets of words in five speech acts. PVI values of duration, pitch, and intensity were used to test the rhythm of vowels. Two main findings were concluded. First, speech act did not have any effect on rhythm, which may be caused by the fact that speech act were not performed on the controlled words in this study. Second, tone had an effect on rhythm in terms of pitch and intensity on some pairs. However, the comparison between the two pairs, tone1-tone2 and tone2-tone3, did not show any significant difference, which may be explained by the nature of phonetic features for tone1-tone2 pair while Chinese third tone sandhi for tone2-tone3 pair. However, this study only used the sets of words that had the same tone. Future studies can put more focus on different combinations of sets of words.

Key words: speech act, tone, rhythm

1. Introduction

The analysis of speech acts has been widely discussed since it was brought up by Austin (1962). A speech act consists of locutionary act, illocutionary act, and perlocutionary act (Austin, 1962). The main argument of speech acts have been focusing on semantic and syntactic domains. However, phonetic domain is little discussed. Though Searle (1965) further explored illocutionary act and proposed that the elements of function indicating device include stress and intonation contour, there was no further discussion related to phonetics. Therefore, in current study, it will examine speech acts in terms of phonetics.

Rhythm is one of the issues that are dealt with in the field of phonetics. Pike (1946) and Abercrombie (1965, 1967) could be seen as pioneers in investigating the rhythm of language. They claimed that isochronism existed in all languages, and languages could be divided into two categories: stress-timed and syllable-timed. There have been abundant studies on speech rhythm. Grabe and Low (2000) investigated and compared different speech rhythms in eighteen languages. Since then, many scholars have been studying further deep into certain languages. For example, Deterding (2011) investigated the speech rhythm of Malay. So far,

the focuses have been mainly on the differences of speech rhythms between languages and the issue of second language acquisition. There are also many studies on the reasons for different speech rhythms within one language. Accents are believed to be one of the possible factors which may affect the speech rhythm (Rathcke and Smith, 2011). Nonetheless, many possible factors remain undiscovered. Therefore, the current study discusses the effects of two possible factors, tone and speech act, on speech rhythm in Chinese. The purpose of the current study is to locate whether tone or speech act have effects on speech rhythm of vowels in terms of duration, pitch, and intensity.

2. Method

Three male students and seven female students were invited in the study. All of them were students in National Sun Yat-sen University, and they were all Chinese native speakers. The age ranged from 19 to 30. In the experiment, the participants were required to produce four sets of sentences: *paobaobao* (to throw up the bags), *miaochaohao* (to depict the person, Chaohao), *paobaodao* (to run Formosa), and *qiaobaogao* (to skip the homework).With the same ending vowel / aʊ /, the effect of vowel quality was controlled. Also, the words in the same set had the same tone. Therefore, the effects of the tone are also under control. (Since the effect of tone sandhi on two tone 3 words is inevitable, it is not considered here.) In each set, there were five sentences corresponding to five different speech acts: command, warn, invite, refuse, and request. In other words, each participant produced 20 sentences in total. The subjects were asked to produce the sentence as if they were really performing the acts in the real context. They were free to add any words in the front or at the back of the sets of words to make the sentence sound more vivid and real. However, any changes to the sets of words were not allowed. All the sounds were recorded to be the data for current study. After the recording, pairwise variability index (PVI) of duration, pitch, and intensity of each vowel in the set of words was calculated. Analysis of variance (ANOVA) was used to detect if there is any significant difference of PVI values between different tones or different speech acts. Further, post hoc pairwise comparisons of the mean scores were performed using the Tukey HSD test if the result from ANOVA was significant. The significance level was set at .05 for all analyses.

3. Results

First, the results of the effects of speech acts on intensity, pitch, and duration are presented as follows, respectively.

Table 1 lays out the results of the one-way ANOVA comparing the mean difference between the PVI values for intensity of different speech acts. As shown, there was a non-significant difference in the PVI values for intensity of different speech acts [$F(4, 195) = .23$, $p = 0.92$].

Table 1 Results of the one-way ANOVA comparing the mean difference between the PVI values for intensity of different speech acts

Speech Acts	N	M	SD	Skewness	Kurtosis
Command	40	3.61	2.59	1.52	2.55
Warn	40	3.66	2.03	.99	.21
Invite	40	3.26	2.29	1.10	.97
Refuse	40	3.40	2.02	.97	.74
Request	40	3.60	2.37	1.20	2.36
Source of variation	SS	df	MS	F	Sig.
Between groups	4.64	4	1.16	.23	.92
Within groups	1004.00	195	5.15		
Total	1008.64	199			

*p< .05

Table 2 lays out the results of the one-way ANOVA comparing the mean difference between the PVI values for pitch of different speech acts. As shown, there was a non-significant difference in the PVI values for pitch of different speech acts [F (4, 195) = 1.61, p= 0.173].

Table 2 Results of the one-way ANOVA comparing the mean difference between the PVI values for pitch of different speech acts

Speech Acts	N	M	SD	Skewness	Kurtosis
Command	40	9.90	8.97	2.21	5.75
Warn	40	11.23	12.77	2.13	4.25
Invite	40	6.47	5.27	2.21	7.30
Refuse	40	12.59	15.99	3.53	14.78
Request	40	10.79	11.33	1.71	1.96
Source of variation	SS	df	MS	F	Sig.
Between groups	844.64	4	211.16	1.61	.173
Within groups	25560.27	195	131.08		
Total	26404.91	199			

*p< .05

Table 3 lays out the results of the one-way ANOVA comparing the mean difference between the PVI values for duration of different speech acts. As shown, there was a non-significant difference in the PVI values for duration of different speech acts [F (4, 195) = .55, p= 0.702].

Table 3 Results of the one-way ANOVA comparing the mean difference between the PVI values for duration of different speech acts

Speech Acts	N	M	SD	Skewness	Kurtosis
Command	40	36.94	14.76	.96	.87
Warn	40	34.66	17.04	.33	-.61
Invite	40	38.87	19.45	.45	.02
Refuse	40	38.42	19.15	.30	-1.06
Request	40	34.40	17.92	.43	-.56
Source of variation	SS	df	MS	F	Sig.
Between groups	688.49	4	172.12	.55	.702
Within groups	61387.18	195	314.81		
Total	62075.67	199			

*p< .05

Second, the results of the effects of tones on intensity, pitch, and duration are presented as follows, respectively.

Table 4 lays out the results of the one-way ANOVA comparing the mean difference between the PVI values for intensity of different tones. As shown, there was a significant difference in the PVI values for duration of different speech acts [$F(3, 196) = 6.256$, $p < 0.01$]. Tukey HSD test indicated that the mean difference between the PVI values for intensity of tone1-tone3 (p= .015), tone2 -tone4 (p= .024), and tone3-tone4 (p= .001) were significant.

Table 4 Results of the one-way ANOVA comparing the mean difference between the PVI values for intensity of different tones

Tone	N	M	SD	Skewness	Kurtosis
Tone 1	50	3.04	2.37	1.61	3.37
Tone 2	50	3.94	2.06	.73	.35
Tone 3	50	4.34	2.48	.97	.92
Tone 4	50	2.70	1.67	1.65	3.63
Source of variation	SS	df	MS	F	Sig.
Between groups	88.14	3	29.38	6.256	.000*
Within groups	920.50	196	4.70		
Total	1008.64	199			

*p< .05

Table 5 lays out the results of the one-way ANOVA comparing the mean difference between the PVI values for pitch of different tones. As shown, there was a significant difference in the PVI values for pitch of different tones [F (3, 196) = 4.513, $p < 0.01$]. Tukey HSD test indicated that the mean difference between the PVI values for pitch of tone1-tone3 (p= .004) and tone1-tone4 (p= .022) were significant.

Table 5 Results of the one-way ANOVA comparing the mean difference between the PVI values for pitch of different tones

Tone	N	M	SD	Skewness	Kurtosis
Tone 1	50	5.44	5.91	3.41	14.88
Tone 2	50	10.31	8.70	2.49	7.40
Tone 3	50	13.10	12.26	1.88	3.33
Tone 4	50	11.93	15.59	3.22	12.94
Source of variation	SS	df	MS	F	Sig.
Between groups	1705.95	3	568.65	4.513	.004*
Within groups	24698.95	196	126.02		
Total	26404.91	199			

*p< .05

Table 6 lays out the results of the one-way ANOVA comparing the mean difference between the PVI values for duration of different tones. As shown, there was a non-significant difference in the PVI values for duration of different tones [F (3, 196) = 1.264, p= 0.288].

Table 6 Results of the one-way ANOVA comparing the mean difference between the PVI values for duration of different tones

Tone	N	M	SD	Skewness	Kurtosis
Tone 1	50	33.52	18.05	.62	-.14
Tone 2	50	40.25	16.97	.21	-.81
Tone 3	50	35.83	20.85	.92	-.38
Tone 4	50	37.03	13.95	-.26	.08
Source of variation	SS	df	MS	F	Sig.
Between groups	1178.06	3	392.69	1.264	.288
Within groups	60897.62	196	310.70		
Total	62075.67	199			

*p< .05

4. Discussion

The current study is dealing with the effects of tones and speech acts on the rhythm, which is analyzed in term of intensity, pitch, and duration. Based on the results of first part,

the temporary conclusion is that speech acts dos not have any effect on rhythm. Some possible reasons may result in this conclusion. First, from the feedback of some participants, it is not really possible to ask subjects to perform the speech act without any situation given in advance. They often felt difficult to feel as if they were in the context. Therefore, it may be proper to collect the data from real contexts, or at least near-real contexts such as dramas or movies. Second, the phonetic cues performing speech acts often do not lie on the verb itself but other words not controlled in this study. For example, when we refuse to throw up the bags, we may say, "I do not want to throw up the bags." In this example, the words that perform the speech act "refuse" is "do not want to" rather than "throw up the bags." Therefore, future studies are encouraged to focus on the exact words that perform the speech act.

Based on the results of second part, the temporary conclusion is that tones have some effects on rhythm in terms of intensity and pitch. As Turkey HSD test had indicated, the differences of PVI values of either intensity or pitch between pairs tone1-tone3, tone1-tone4, tone2-tone4, and tone3-tone4 were significant. The only two pairs, tone1-tone2 and tone2-tone3 did not show any significant difference in rhythm. In terms of the pair tone2-tone3, Chinese third tone sandhi may play a role. Many scholars (Brotzman, 1964; Shih, 1986; Wang and Li, 1963) had done a large amount of research on Chinese third-tone sandhi and claimed that a third-tone word would become identical to tone2 when it is preceded by another third-tone word. Therefore, it is not surprising that tone2-tone3 did not show any significant difference in rhythm.

5. Conclusion

This study focused on the effects of speech acts and tones on rhythm in terms of duration, pitch, and intensity. The result showed that speech acts did not have any effect on rhythm while the result of tone showed quite the opposite. However, this paper only dealt with only Chinese. Other tone languages are worth further exploring on this issue.

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