

Speech rate and CFL instructional audio materials preparation

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论文摘要：为帮助外语学习者提高听力理解水平和语言习得，我们经常会控制听力学习材料的语速。本文对在美国大、中学中常用的两套初级汉语教材课文录音的语速进行了统计，为汉语教师在准备教学材料时提供参考。

1. Introduction

In second language learning and instruction, speech rate has been one of the many factors that are often controlled by native speakers and instructors to assist learners' listening comprehension. When native speakers talk to non-native speakers, for example, it has been observed that they tend to resort to foreigner talk, which is characterized with, among other simplifications such as syntax and register, slower speech rate (c.f., Wooldridge, 2001). When foreign language instructors speak to beginning or even intermediate level learners in a classroom setting, their speeches are also likely to be slower than when they talk to advanced level learners (c.f., Chaudron, 1988). While such foreigner or teacher talk may have been used intuitively or intentionally by native speakers or instructors to provide more comprehensible input to learners, empirical research on the effects of varying speech rate on foreign language listening comprehension has produced mixed results (Rost 2005, Zhao 1997). On the one hand, researchers such as Griffiths (1990) have reported that slower speech rate, when aided with other simplifications in syntax and rhetorical structure, will improve ESL (English as a Second Language) learners' listening comprehension. On the other hand, Blau (1990) has found that simply reducing speech rate from faster to slower does not improve the listening comprehension of intermediate and advanced level EFL learners.

Similar to other foreign languages, we have observed that speech rate has been the target of control in CFL (Chinese as a Foreign Language) learning and instruction. A case in point is Hanyu Shuiping Kaoshi (HSK, or the Chinese Proficiency Test), which uses a set of different speech rates as measurement of CFL learners' language proficiency. According to HSK Syllabus (国家汉语水平考试委员会办公室, 1998, 2001 and 2003), speech rates for the basic, elementary-intermediate and advanced level tests are 120 – 170, 170 -220 and 180-260 characters (syllables) per minute, respectively. Additional examples include many beginning level CFL textbooks such as Integrated Chinese (Yao, etc., 2005), which provide audio recordings of the same learning texts at different speech rates.

While more extensive research is needed to determine whether controlling speech rate will have comparable effects on CFL learners as those reported about EFL learners, an immediate need in CFL classroom-based instruction today is information about the audio recordings provided by textbook publishers that CFL instructors can refer to when selecting or authoring audio materials for their students. This is especially true for audio materials designed for testing purposes, where they are expected to match the speech rates

of textbook materials so that test validity and reliability can be maintained. In this study, we measure the speech rates of two beginning level CFL textbooks used in U.S. colleges and high schools. We hope that such statistical measure of beginning level audio materials will enable CFL teachers to make more informed decisions in their selection and preparation of instructional materials for CFL learners.

2. This study

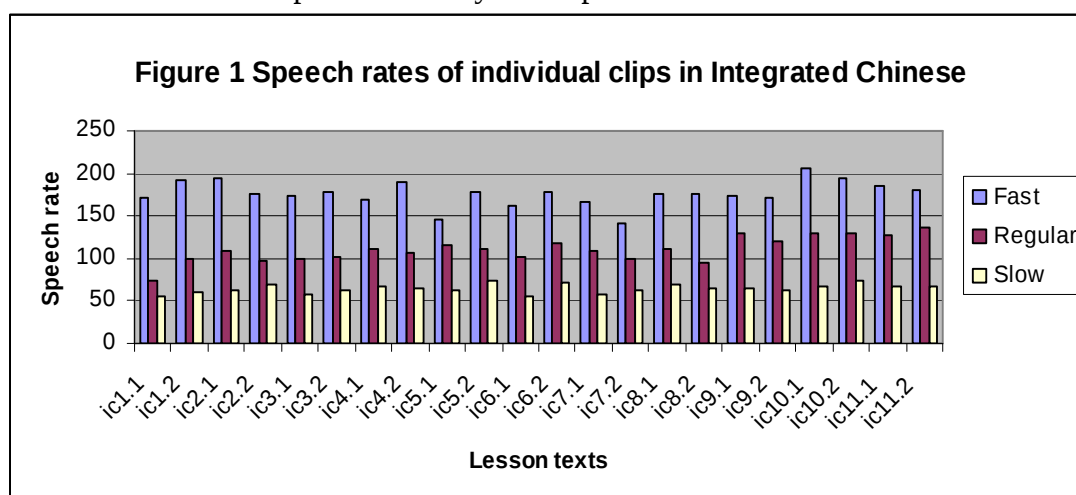
2.1 Audio samples and speech rate measurement

In this study, we measure the speech rates of two popular beginning level CFL textbooks used in U.S. colleges and high schools, which include Integrated Chinese (Level 1 Part 1) (Yao, etc., 2005) and Chinese Link (Level 1) (Wu, etc., 2006). Integrated Chinese (Level 1 Part 1) contains 11 lessons with 2 pieces of learning texts (课文) in each lesson and provides audio recordings of those texts at fast, regular and slow speed. Similarly, Chinese Link (Level 1) contains 22 lessons with 1 piece of learning text (labeled as Language in Use) in each lesson and provides audio recordings at both normal and slow speed. While the learning texts in both textbooks are either dialogues or monologues (diary and personal letters), their audio recordings are not spontaneous speeches but reading aloud (of those prepared scripts) by native speakers in a studio setting.

We calculate speech rate based on measurement of duration and number of audible syllables in individual audio recordings. The duration of an audio clip is measured from the beginning of the first audible syllable to the end of the last audible syllable. The number of audible syllables in individual audio clips is counted from their corresponding printed texts. To enable reduplication and verification of our study in the future, the diminutive suffix *er* (儿) is counted as an independent syllable in our measurement.

2.2 Results

22 audio clips from Integrated Chinese and 22 clips from Chinese Link were measured. Individual speech rates from the 44 clips are shown in Figures 1 and 2, where unit of measurement for speech rate is syllables per minute.



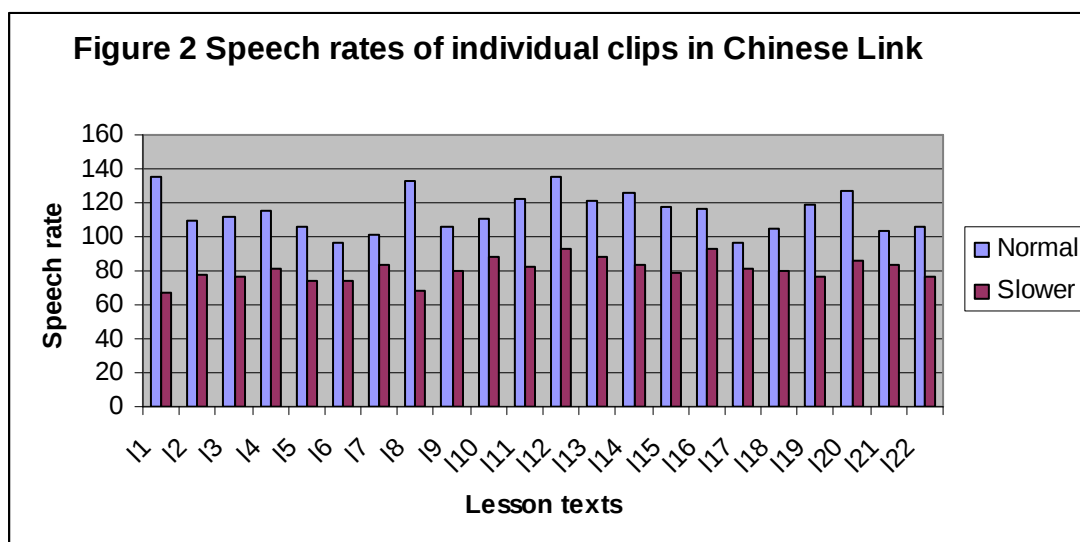
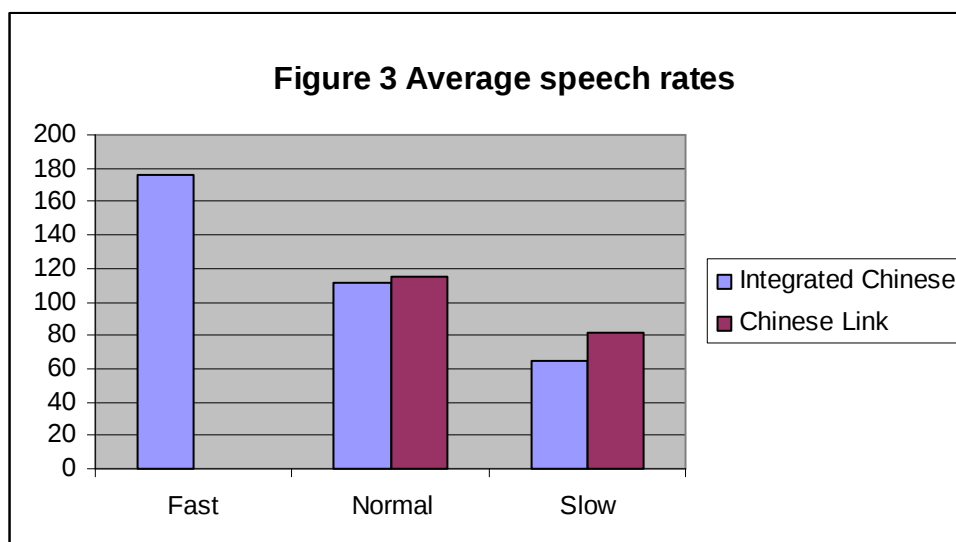


Table 1 lists the distribution statistics of those individual audio clips and the average speech rates under different speed categories are shown in Figure 3. Unit of measurement for speech rate is again syllables per minute.

Table 1 Speed rates of Integrated Chinese (Level 1 Part 1) and Chinese Link (Level 1)

	Integrated Chinese (Level 1 Part 1)	Chinese Link (Level 1)
Slow rate		
Average rate	65	81
Standard deviation	5	7
Maximum rate	74	93
Minimum rate	56	68
Range	18	25
Normal rate		
Average rate	111	115
Standard deviation	15	12
Maximum rate	135	135
Minimum rate	75	96
Range	60	39
Fast rate		
Average rate	176	
Standard deviation	15	
Maximum rate	205	
Minimum rate	142	
Range	64	



Results presented in Table 1 indicate that 1) slow speed recordings provided by the two textbooks are well below the 120 – 170 syllables per minute range prescribed for the HSK basic level test; 2) normal speed recordings of both textbooks overlap partially with the lower end of the HSK basic level range; and 3) fast speed recordings of Integrated Chinese overlap partially with the upper end of the HSK basic level range.

A series of *t*-tests were also conducted to find out if there were any significant differences among the different groups of recordings in those two textbooks. In the case of Integrated Chinese, there is a significant difference between its fast and regular speed recordings ($p < 0.01$) and between its regular and slow recordings ($p < 0.01$). For Chinese Link, significant difference is also found between its normal and slow speed recordings ($p < 0.01$).

Under the assumption that the learning texts from both textbooks cover similar topics and use comparable languages (vocabulary, grammar and text length, etc.), we conducted *t*-test to compare the speech rates of normal and slow speed recordings between Integrated Chinese and Chinese Link. No significant rate difference in normal speed recordings is found between the two textbooks. However, there is a significant rate difference in slow speed recordings between the two textbooks ($p < 0.01$). If our assumption about their texts is valid, then the two *t*-tests suggest that the authors of the two textbooks have provided similar audio materials under the normal speed category. However, they differ in their slow speed recordings.

3. Concluding remarks

In this study we measured the speech rates of audio materials accompanying two beginning level CFL textbooks used in the U.S. Hopefully, such measurement can be used by CFL instructors as references when they prepare audio materials for their students. For example, instructors can prepare audio materials at similar rates for use in achievement tests where test reliability is a major concern. They can also prepare materials at (much) faster rates that are more likely found in speeches among native speakers.

It should be noted that this study is conducted to meet current pedagogical needs in CFL classrooms. Despite its relevance for CFL classroom pedagogy, we are not suggesting that those measured speech rates should be the appropriate rates for beginning level CFL instruction and learning. More explicit research is needed to determine if varying speech rates will have any effects on CFL learners' listening comprehension and acquisition, and if there is indeed a positive effect, what are the optimal speech rates for learners at different proficiency levels.

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