

The Application of *Praat* in English Pronunciation Teaching

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Abstract—Suprasegmentals, long thought to be crucially significant in communication, are increasingly addressed in pronunciation teaching. This study examines the application of speech visualization software Praat in suprasegmentals teaching, illustrating how teaching can be further enhanced through visual signal feedback.

Keywords—*Praat; speech visualization; suprasegmentals*

I. INTRODUCTION

Language is an important tool of human communications and exchange of ideas. As the "material shell" of language, pronunciation is an important carrier for people to learn a foreign language. To measure whether a language is spoken fluently and accurately, an important criterion is whether the speaker's pronunciation is correct and standard, because the sound is an intuitive expression in the language. Because of this, the importance of learning English pronunciation for English majors should never be neglected.

II. ENGLISH PRONUNCIATION TEACHING

English pronunciation teaching initially began in the 19th century, and then affected by the different schools of language teaching. At the beginning of the 20th century, the direct teaching method appears. This teaching is an Intuitive-imitative Approach, which is embodied in the "intuitive - imitation - repetition" mode. Language learners rely on their own to acquire pronunciation and rhythm of the target language. Then in 40s and 50s of 20th Century, influenced by structural linguistics, Audiolingual and Oral Approach emerge. A set of teaching tools such as phonetic symbols, pronunciation diagrams, and charts are employed to carry out specific teaching activities, usually using the sentence to achieve the minimum contrast sound practice. Since the 1970s, English pronunciation teaching has been influenced by communicative language teaching, with teaching focus moving from traditional segmentals, i.e. vowels and consonants, to suprasegmental, including stress, rhythm and intonation.

According to the current language teaching method, the pronunciation course pays great attention to the study of the suprasegmentals (stress, rhythm and intonation) in the content setting (McNerney and Mendelson 1987; Chun 1988; Dickerson 1989). They carry the "pillars" of all discourse

content, reflecting the speaker's current feelings while highlighting the most important message of the speaker. Studies have shown that the teaching of suprasegmental can be effectively carried out with the aid of instruments and equipment. The specific process is as follows: firstly, the instrument signal is used to process and extract the speech signal, and then the tone and intensity are displayed through the real-time video screen. The three aspects of stress, rhythm and tone are visualized. The two discourses are displayed on the same screen. The upper part of the screen is the discourse of the native speaker. The lower part shows the learner's words for comparison. The effectiveness of this method has been experimentally proved. (James 1976; deBot 1983). The experiment finally showed that the visual teaching of visual feedback combined with auditory feedback is more effective than the teaching of auditory feedback alone. Wang Guizhen (1990), a domestic leading scholar, found that Chinese learners applied the syllable rhythm of Chinese to the English rhythm to some extent, instead of using the accented rhythm of English correctly. Hahn (2004) also concluded through experiments that compared with the accurate pronunciation of phonemes, suprasegmentals have more prominent significance in the successful realization of the "understandability" of discourse. In recent years, with the development of computer hardware software, language teachers can easily use the tools of visual feedback to carry out the teaching practice of suprasegmentals. Chun (1989) has explored several methods for teaching supersonic phonemes with hardware and software. In addition, she introduced the functions and cost of use for various devices and software. Finally, it is suggested to modify the teaching materials and courseware according to the teaching focus of the suprasegmentals.

III. SPEECH VISUALIZATION TECHNOLOGY

In the 1960s, speech visualization technology was introduced in language teaching, the tone analyzer used in the language acquisition for the deaf-mute. After its application in the second language acquisition for tone learning, researchers soon realized that the advantage of using visualization technology was to enable learners to fully focus on the prosodic features of the spoken content. It is extremely difficult for learners to understand the tone system if they do not have excellent listening ability and good language training. However, by visually presenting the tones,

the auditory information in the closed language system is converted into visual information, thereby achieving successful decoding. By the 1980s, a framework system combining instrumental analysis and tone patterns emerged, and researchers were able to interpret different spectrum displays based on this system. Based on the tone pattern developed by Hart and Collier, Kees de Bot summarized a set of observable tone elements, including changes in the pitch, range, speed and position. This classification was validated by empirical studies in which Dutch and French-speaking English learners compared their perceptions and output to tone, confirming that the use of visualization techniques is clearly beneficial to language teaching activities. Learners who receive audition feedback have a clear advantage in understanding and outputting the tone pattern, and are able to perceive tonal changes more quickly. Then in late 80s and early 90s of 20th century, the effectiveness of speech visualization technology has been recognized through the wide application of a series of related software and hardware systems. Some academic researchers have introduced this information into the field of foreign language teaching, with a focus on the application of this technology in specific groups of foreign language teaching such as international teaching assistants (Anderson-Hsieh, 1989, 1992.)

In recent years, with the development of computer-aided language teaching, domestic teachers are not satisfied with relying on a single auditory media, and start to explore the possibilities of employing various kinds of speech visualization software. Xie Ping (2007) used the Speech Analyzer to analyze the parameters of the phonemes, so that students can intuitively perceive the physical characteristics of speech; Zhuang Muqi (2011) verifies the effectiveness of Better Accent Tutor software through an empirical study after analyzing the results of three groups of students. Li Yingjie (2010) carried out a test of improving learners' pronunciation in English phonetic learning, exploring the feasibility of learners carrying out independent learning through speech visualization software. This learning can be realized by correctly grasping, identifying the stress and intonation of English words and sentences. The experimental results show that this method can achieve satisfactory results.

IV. USING PRAAT IN TEACHING SUPRASEGMENTALS

The speech visualization tool used in this study is Praat, meaning "talk" in Dutch. It is a kind of computer software for analyzing speech in phonetics, jointly developed by Paul Boersman and David Weenink, the Institute of Speech Science of the University of Amsterdam in the Netherlands. Compared with other similar software, it has obvious advantages such as free download, small space, user-friendly operation interface, and timely updates. Previously, it was mainly used by researchers to conduct speech research, performing spectrum analysis, labeling speech signals, and generating text reports. In recent years, it has been applied to pronunciation teaching for English learners.

A. Visualization of Word Stress

To communicate clearly when you are speaking in English, it's important to stress the correct syllables in each word. This is called word stress, which means pronouncing one syllable of a multisyllabic word with greater emphasis than the other syllables in the word. For example, the noun 'produce and the verb pro'duce have different stress. "Fig.1" shows a contrast of waveform for different stresses. With larger amplitude suggesting the loudness of stress, it is easy to see whether the stress falls on the first syllable or second one. Likewise ("Fig.2"), a pitch contour drawn by Praat reveals another acoustic feature of stress, that is, higher frequency.

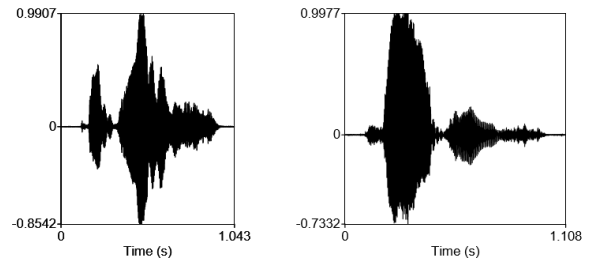


Fig. 1. Produce(v.) and produce(n.) (Amplitude)

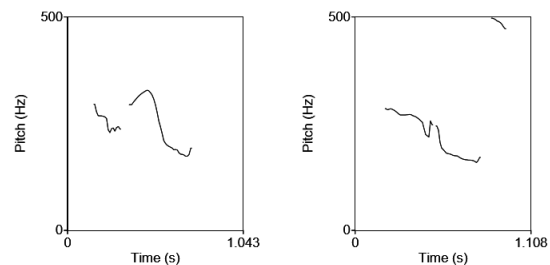


Fig. 2. Produce(v.) and produce(n.) (Pitch Contour).

B. Visualization of Intonation Contour

Intonation, the tone of the speech, is the configuration and change of the pitch in a sentence. Although both falling tones and rising tones exist in English and Chinese, there is still a difference. The example listed below is an opening line "When you are old and gray and full of sleep" taken from W.B.Yeats poem *When you are old*. In the beginning sentence, the speaker directly invites his love to an imaginative future when she appears to be not young and attractive. With a list of adjectives and phrases going on such as "old", "gray", "full of sleep", a continuous rising tone should be applied ("Fig.3"). However in "Fig.4", a student output suggests an error in intonation, pitch dropping at the end of every content word. Through a comparison of right and wrong intonation contour, students would be able to adjust their output accordingly.

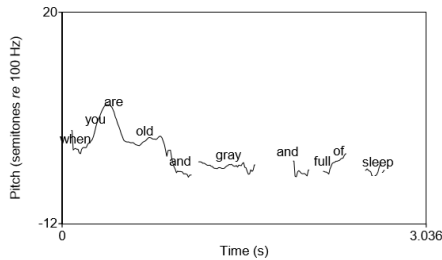


Fig. 3. Pitch Contour produced by a native speaker.

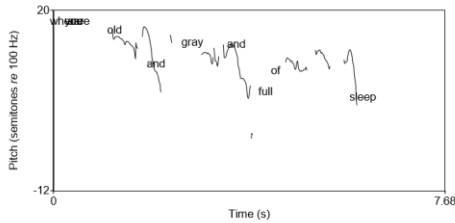


Fig. 4. Pitch Contour produced by a non-native English learner.

V. CONCLUSION

Traditionally, English pronunciation teaching mainly relies on teachers' own abilities, correcting student's phonetic errors by listening and giving feedback. Nowadays, with the widespread use of computer-aided teaching, pronunciation teaching methods tend to be more diversified. As more emphasis have been given to suprasegmental like stress, intonation, a more significant and effective element in the process of communication, the speech visualization technology turns out to have an advantage by showing the properties of sounds such as frequency, pitch, duration etc.

Although the application of speech visualization software to English pronunciation class is still somewhat new, but it is believed that as modern educational technology applied more and more in the classroom, it will play a more active role in promoting the teaching of English phonetics. In the meantime, further learners' training of speech visualization software can help learners break through the inherent categorization knowledge and establish a new category of perception, thus improving the accuracy of the target language. And the proper use of speech analysis software in pronunciation teaching can achieve significant results.

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