ISSN 2348-3024

European Portuguese Phonetics: Difficulties for Chinese Speakers - Considerations

NUNES, Ana Margarida [ananunes@umac.mo]
University of Macau, FAH– Department of Portuguese

Abstract

The present paper is a pilot study focusing the common difficulties that either Mandarin or Cantonese speakers present on writing Portuguese. The observed problems are an obstacle on the accurate learning of European Portuguese and are related with the Portuguese minimal pairs [p]/[b]; [t]/[d]; [k]/[g] that are often misunderstood. Those specific examples the use of [p] instead of [b] may create a new word but also a different meaning, as example: [ɓɔ[ə] (small boat) instead of [pɔ[ə] (big vase), or [ʁəʃɛpə] (not existing) instead of [ʁəʃɛɓə] (receive).

Works of 25 students were selected and 43 occurrences analyzed. Recognizing the limitations of the present research the results show that the prevalent confusion is with the pair [t]/[d] when in CCV context. The study (although recognizing its limitation) should be seen as approaches and reflections that must be deeply studied and data being important to Second Language Teachers and researchers.

Keywords: European Portuguese; Chinese; Cantonese; Second Language Acquisition; Writing,

Council for Innovative Research

Peer Review Research Publishing System

Journal: JOURNAL OF ADVANCES IN Linguistics

Vol.4, No. 3

editorjalonline@gmail.com

www.cirjal.com

ISSN 2348-3024

Introduction

It is well known that Chinese's are lately becoming more interested about Portuguese Language and Culture due to the vast possibilities of business with not only Portugal but especially with Brazil and Angola. Being a Professor of Portuguese at the University of Macau, China, I am always confronted with the differences of the languages and the problems that learners (Mandarin and/or Cantonese speakers) have to face. This research has an experimental nature and its focus is the acquisition of Portuguese consonants by Chinese learners of Portuguese as a Second Language. In this particular case it will be analyzed the European Portuguese (from now on EP) and not the Brazilian variety that the students have also access.

Second language acquisition is a complex process that involves, among other things, the simultaneous acquisition of a new sound system and lexicon and the relation between speech production and speech perception is important (Fowler, Carol A., pp. 633), so it is clear that these students are most probably writing the same way that they perceive the phones and by that, the words. Nevertheless and given the scarcity of studies about European Portuguese as a Second Language for Chinese speakers very few is yet known about the major difficulties of these students. Chinese speakers learning Portuguese do have all the same and common linguistic conflicts that all adults have when experiencing a new language: Word order; animacy; grammar rules and exceptions; number and gender of the words (something that is a great dilemma for Chinese learners, once that they seem not to have this distinction so marked as in EP); pronunciation and the center of this research phonetic difficulties.The phenomenon described as foreign accent may be a consequence of differences between the production of one or the other language phonetic level. It is quite common that speakers of two different languages that share a certain similarity in a particular phoneme set for that segment the same phonetic realization in both.

Studies report high levels of anxiety on learning a foreign language (MacIntyre and Gardner, 1994) "the feeling of tension and apprehension specifically associated with Second Language contexts, including speaking, listening and learning". If this is true for all the students can be even more evident for Chinese students. According to personal experience and as result of some literature review, it is known that Chinese students do not like to be exposed so they will mainly interact with the professor if they fill very confident about their answers, meaning that anxiety on speaking or writing in a foreign language and the fear of failing or the sense of self-esteem it is noticeable on the students that the texts are here analyzed.

Second Language acquisition

According to a study carried out by McQueen and Cutler (2006) 'listeners come equipped to deal with variability in speech sounds – whether that variability arises from differences among speakers or within a given speaker over time' meaning that listeners can modify their own perception of utterances produced by a speaker if they feel some unusual characteristics on their speech. In the present analysis the speakers are all adults (all with an average age around the 20 years old) so the main point it is also correlated with the fact that some adults trying to learn a foreign language, in this concrete set of circumstances, in a country where the language is not spoken very often or in a daily basis (in Macau it is used English as "língua franca"), they are "exposed to much less language input than an average child." Meaning that all the material that an adult as access is not so concentrated and not so dynamic or real than for a child so it is obvious that " a general deficiency of input may well explain many cases of adult foreign language errors", according to Robert Bley-Vroman (The logical problem of foreign language learning, pp. 41-68, 1989).

In adults the complete success on learning a foreign language it is very difficult perhaps it does not even exist and in its "Interlanguage" article, Serlinker (1972) stated that the "rare cases of apparent complete success could be regarded as peripheral to the enterprise of second language acquisition theory". Serlinker (1972) believed that only 5% of adults would have a complete success in second language acquisition. However what can be said about the Chinese students of Portuguese as a second language is that some of them, and considering that both languages are typologically different, develop a competence and performance near native-speakers. The degree of achievement on adults has a substantial variation; they tend to fail in different degrees even if they have a more constant exposure to the language, in the specific analyzes that is described in this paper students study for four Scholl years to have their Bachelor in Portuguese Studies. The variation on their accomplishment is strictly related with their learning strategies according to Robert Bley-Vroman (1989) but also with their motivation, future expectations and communicative needs, such variation is universally accepted is a type of "general problem solving".

Many studies are focused on the requirements needed to work on L2 pronunciation lessons: Focusing on tasks of production and perception of the sounds of foreign language. Escudero (2000) shows that the improvement of the perception of L1 and L2 is influence by the input nature to which students are exposed. For this reason there are two dominant theories on the perception of L2: the Model of Learning (Speech Learning Model - SLM) of Flege (1995) and the Perceptual Assimilation Model - PAM), Best (1995). These models attempt to explain how adult speakers of L2 may learn to perceive non-native contrasts and how their particular perception is different from the perception of native L1. The two theories point to the linguistic experience as the predominant factor. It is supported by the literature that activities such talking and listening are close. In the public domain it is important that the speaker knows if the listener can perceive clearly what is being said. The relation between speech production and speech perception is also important in the private domain in which 'articulatory mechanisms support talking, and perceptual mechanisms support listening to speech' (Fowler, pp. 633). As stated by Mitterer and Cutler (2006) to understand someone's speech and to learn a language it is necessary to recognize words. This means being able to distinguish between words that are very close such as for European Portuguese: [pɑʈu] (duck) and [bɑʈu] (beat) or [fɑkɐ] (knife) and [vɑkɐ] (cow).

It is known that the phonological elements have their primary differences in the vocal tract and not in the mind (production versus perception) in linguistic terms there are significant actions of the vocal tract that are called gestures (Fowler, Carol A., pp. 634). Those different actions or gestures are dynamic and show the difference between pairs like [t] and [d]; [p] and [m]; [p]and [b] and also between [f] and [v]. The differences between minimal pairs are simple to understand if listeners perceive gestures. Nevertheless the pairs that we present just differ on the voiced/unvoiced parameter and not that much on the articulation for European Portuguese. According to a study carried out by McQueen and Cutler (2006) 'listeners come equipped to deal with variability in speech sounds – whether that variability arises from differences among speakers or within a given speaker over time' meaning that listeners can modify their own perception of utterances produced by a speaker if they feel some unusual characteristics on their speech.

One common characteristic of adolescents or adults who learn a second language in a late stage is the different way that they accent some phonetic segments and sequences of the new language. The phonetic realization of phonological structures in the L2 is different from native language patterns. When producing sentences in L2, speakers often produce phonetic segments and sequences that appear to be a product of complex interaction between L1 and L2 phonetic realization rules (Spanish accented English Speakers; American-accented Japanese speakers).

Studies have shown that adult listeners' perception of non-native consonant and vowel contrasts have demonstrated a poor performance when compared with native language listeners for several of the phonetic contrasts. On a study carried out by Flege and Wang (1989) it was reported that native Chinese learners of English could perceive voicing contrasts in final stop consonants in contexts where they had a preceding vowel, closure voicing and release cues. However, when the final consonants were unreleased their performance wasn't so great, and the native speakers could maintain their perceptual differentiation. Pikser (2003) had similar results for native Spanish-speaking learners of English on final stop consonant voicing contrasts; performance on the released stops was below native-speakers levels.

It is also stated by Strange et al. (2004, 2005) and Levy (2004) that L2 phonetic segments that are very different from the L1 phonetic category will be perceived relatively better. On the other hand, L2 phonetic segments that are more similar to L1 will continue to be "misperceived and mispronounced". According some studies done with American and German listeners, in continuous speech contexts, English L2 learners of German will have much more difficulties differentiating vowel contrasts.

All phonetic features that can serve to distinguish phonological segments (contrasts in certain languages) can be differentiated acoustically. For example voicing contrasts between oral stops consonants in English) pet-bet; bet-bed, are differentiated by temporal parameters, like VOT – Voice Onset Time for initial stops, duration of consonant closure for medial stops, preceding vowel duration for medial and final stops and also by spectral characteristics. Speech as an acoustical signal is a code in which the phonetic segments and sequences are specified by context-dependent and each language specific acoustic parameters.

Speech perception involves decoding the acoustic signal to recover the phonetic message (Liberman at al. 1967; Liberman and Strange 1985).Cross-language studies with infants that were exposed to different languages were examined to determine if acoustic parameters associated with non-native phonetic contrasts were discriminated. For example voiced and unvoiced, aspirated syllable – p and b – for English and the stop phones /p/ and /b/ for Spanish). The monolingual Spanish speakers showed good discrimination of the aspirated consonants but the same did no happen with the other contrasts. Several studies, for example comparing infants with adults with contrasts in Hindi and English languages, showed that infants perform better and can discriminate better the place of articulation contrast. In adults it seems that native-language phonetic perception is strong and mechanic. The ability to extract the phonetic message from the acoustical signal even in non-optimal situations (noise, unfamiliar talkers, and distracting tasks) requires cognitive resources on the part of the native listener, on a perception task. Language-specific patterns of performance are not related to differences in basic auditory capabilities of adult speakers of different languages, they reflect the language-specific patterns and the acoustic-phonetic relation that they know. All the sequences and its categorization have become automatic even if the listening conditions are not optimal, Strange (2006).

Some aspects of Portuguese and Chinese phonetics

Everybody that want to learn (or even teach) a foreign language should know about the importance of general phonetics in what concerns pronunciation as well as grammar, Ball (2009). To pronounce a sound it takes air, movement and some occlusion to air flow. There are several parameters that allow and even differentiate speech sounds. Most speech in natural language involves a pulmonic egressive airstream. The air flows upwards from the lungs, trough the larynx and then into the pharynx (oral or nasal cavities). Phonation is exactly the term used to describe the different modifications to this airflow as it passes trough the glottis (space between the vocal folds) within the larynx, Ball, 2009. To produce different sounds the vocal folds have distinct behaviors in the case of the consonants that are studied in this paper it should been explained that to produce the plosives [p, t, k] that are considered voiceless consonants, the vocal folds are usually apart and they will not vibrate. On the other hand to produce [b, d, g] the vocal folds are close together and vibrating when the air passes through them.

In the specific case of European Portuguese and the example of the 6 stops or plosives [p, t, k] and [b, d, g] that just differ on the degree of closure between articulators, giving therefore origin to voiceless and voiced consonants respectively, it is curious to underline that those sounds are usually and often misperceived by children at the stage that they start learning to read and write (around 6 to 8 years old). This confusion, even in native speakers, may give an idea about the irregular characteristics of these stops acoustics'. It is even observe, as noticed with Chinese learners of Portuguese, that the pair (t → d) is the one that occurs more frequently. As such this can be also a possible explanation to the big difficulties that

foreigners have with the Portuguese system of stops, once that it seems very hard to pronounce or hear the difference between voiced and voiceless stops.

Accordingly and to summarize the European Portuguese plosive's articulation: [b] voiced consonant, the airstream is impeded (or "stopped") by the lips (voiced bilabial stop); [d] voiced alveolar stop; [g] voiced glottal stop; on the other hand we have the all the voiceless pairs [p, t, k]: bilabial stop; alveolar stop and glottal stop respectively.

The case of Chinese it is necessary to fix a standard to unify the pronunciation across China. The Chinese alphabet is simply a phonetic system for representing the National Pronunciation of Chinese, according to Chin-Shi, Li (reprint of 1922). Once that Peking is the capital, the Pekingese pronunciation is seen as standard, yet there are two varieties Mandarin (Southern and Northern Mandarin). In this case it is also important to mention the Cantonese, of course, that is everywhere. According to Chin-Shi, Li (reprint of 1922) Cantonese is predominant abroad. Cantonese has been the one Chinese dialect most influenced by European language as a result of the contact with English in Hong Kong and Portuguese in Macau. Cantonese has since the past attracted the attention of the Western scholars and as result there are many publications and studies of the Cantonese sound system, because of all that it may be possible to state as Bauer, Robert S., Benedict, Paul K. (1997) that 'on Chinese dialects Cantonese most probably ranks as the second most important after mandarin' .

Spoken Chinese has nineteen consonants plus three palatals and some syllabic consonants and even when a 'syllable begins with a vowel, there is sometimes a consonant-like articulatory gesture before the vowel', (Duanmu, 2007). Some differences that can be noticed are that Chinese has aspired sounds of the consonants [p, t, k, ts] what does not happen in European Portuguese. It is also interesting to notice that in Chinese according to the findings of D. Zhou and Wu (1963:22), the tongue tip when pronouncing the dentals [ts, ts^h s, t, t^h , n, l] can be on "either the upper or the lower teeth", which may perhaps help understand why Chinese students do not grasp the correct articulation of some sounds. In a study by Fu (1956:4) notes that some Beijing speakers use interdentals instead of the dentals [ts, ts^h , s], (Duanmu, 2007), those articulation differences do not cause any distinction between words, since those distinctions are tonal.

There exist several representation systems of the Chinese sounds and characters: the "Cantonese Pinyin" created by Yu Bingzhao in 1971, adjusted later, 1990, by the "Institute of Language in Education". In 1993 was created the "Jyutping" system developed by the Hong Kong Government and described as "multifunctional, systematic, user-friendly, compatible with all possible modern Cantonese sounds, and solely based on alphanumeric characters without any diacritics and strange symbols. There is also the "S.L. Wong Romanization" created by Wong Shik Ling based on the International Phonetic Alphabet and published in 1941 and, finally the "Yale Romanization", system created by the University of Yale to represent Cantonese, mandarin, Korean and Japanese.

All those systems are represented in the follow table:

IPA	Jyutping	S.L.Wong Romanization	Cantonese Pinyin	Yale Romanization
[p]	[b]	[b]	[b]	[b]
[p]	[p]	[p]	[p]	[p]
[m]	[m]	[m]	[m]	[m]
[f]	[f]	[f]	[f]	[f]
[t]	[d]	[d]	[d]	[d]
[t^h]	[t]	[t]	[t]	[t]
[n]	[n]	[n]	[n]	[n]
[l]	[l]	[l]	[l]	[l]
[k]	[g]	[g]	[g]	[g]
[k^h]	[k]	[k]	[k]	[k]
[ŋ]	[ng]	[ng]	[ng]	[ng]

***Table 1**: Representing Chinese Romanization systems.*

The phonetic symbols used to describe the consonants are almost all the same once that the phonemes /m/, /f/, /n/ e /l/ are pronounced the same way in Portuguese and Cantonese. However as it is possible to observe in the Cantonese phonetic system we cannot find the voiced consonants /b, d, g/.

ISSN 2348-3024

So therefore based on some phonetic transcriptions of Chinese words, it is noticeable the similarity between sounds in Chinese that in European Portuguese are minimal pairs therefore representing different words. For example in Chinese (written in Pinyin) we may have[1]:

Word	Phonetic transcription	meaning
bin1	[p^{j} in]	guest
pin1	[p^{h} ^{j} in]	piece together
dai4	[tai]	bag
tai1	[t^{h} ai]	embryo
guai4	[k^{w} ai]	strange
kuai4	[k^{h} ^{w} ai]	fast

Table 2: *Examples from Chinese language*

Those examples come to show that the difference between consonants that in European Portuguese are considered completely different and are minimal pairs in Chinese is not so clear, Nunes & Martins, 2013. The difference between *dai4* and *tai1* is only the tone, or if we see the phonetic transcription is given by the aspiration of the consonant. This phenomenon does not occur in European Portuguese, where we do not have tones or aspiration of consonants. According to Duanmu, 2007, does not exist an agreement whether we can consider [tai] and [t^{h} ai] a minimal pair, once that this depends if [t^{h}] is considered one sound only. Of course that the idea of minimal pair is that two words just differ in one sound only that can distinguish them. Even though we consider that this examples can probably help us to explain the confusion that Chinese learners of Portuguese make with pairs like [ʈɪɐ] (aunt) and [ɗɪɐ] (day) or [ɢɔɭɐ] (collar) and [kɔɭɐ] (glue) where they present difficulties on perceiving the initial sounds. In European Portuguese the contrast is on the voiced – unvoiced characteristic; [p, t, k], (unvoiced) [b, d, g] (voiced).

German, English or French learners do not have this problem however, Spanish learners of Portuguese, due to the proximity between both languages, show difficulties in terms of perception of these minimal pairs. According to Nunes et al. (2006) the proximity of languages can represent an obstacle to the acquisition of some phonetic segments, namely of European Portuguese. Therefore phonological similarities favor transfer.

Methodology

2.1.1. Corpus

The presented *corpus* was collected from 3 different written works of 25 informants all undergraduate students at the University of Macao attending, at the time, the third year of the Portuguese Studies Bachelor during the second semester of the Academic year of 2013-2014. During the third year students are already expected to have a great performance in Portuguese with a deeper knowledge of lexicon, grammar and several linguistics aspects (syntax, semantics, prosody, phonetics, etc…) All the works were, as usual corrected and graded, and only the specific cases (words) were highlighted to be described here. All the students will remain anonymous.

It is important to emphasize that the *corpus* is very limited; being only a pilot study that hopefully will conduct to the creation of several well supported and different *corpora* to sustain and explain some of the first ideas included here and explain much more and better other problems, constrains and difficulties that are usually felt by Chinese students who want to learn Portuguese.

The most part of the *corpus* presents the more common difficulties that they exhibit in what concerns to European Portuguese minimal pairs [p, t, k] / [b, d, g], but it was also of particular interest to just show some other specific occurrences' on this students such as the confusion between [l] and [r]. One of the concerns to do this work was to provide the students with an ample time to write and even the possibility of using the dictionary, at the same time the subjects of the written works were always of their concern or even open topics where they could write about their own interests. For this study it was not take into consideration the presence of stressed or unstressed vowels, nasals or final position.

In the next 4 tables are exposed 8 different wrong replacements of consonants and selected words where students present discrimination problems:

When [d] becomes a [t]	Correct word	**When [t] becomes a [d]**	Correct word
Funtamentais	**Fundamentais (Fundamentals)**	Pergundar	Perguntar
Matrasta	**Madrasta (Stepmother)**	Enquando	Enquanto
Secuntária	**Secundária (Secondary)**	Lendamente	Lentamente
Muto	**Mudo (Mute)**	Indensificar	Intensificar
Ententimento	**Entendimento (Understanding)**	**Gado (Cattle)**	**Gato (Cat)**
Cortão	**Cordão (Cord)**	Caudela	**Cautela (Caution)**
Responteu	**Respondeu (Answered)**	Imudável	**Imutável (Immutable)**
Ententer-se	**Entender-se (Understand each other)**	Afasdatas	**Afastadas (apart)**
Patrão (Boss)	**Padrão (Standard)**	Vandagens	**Vantagens (Advantage)**
Rápita	**Rápida (Quick)**		
Rapitamente	**Rapidamente (Quickly)**		
Estúpitas	**Estúpidas (Stupid)**		
Arrepentem	**Arrependem (Regret)**		

***Table 3**: [t] instead of [d] and [d] instead of [t]*

ISSN 2348-3024

When [k] becomes a [g]	Correct word	When [g] becomes a [k]	Correct word
Compligado	**Complicado (Complicated)**	Códico	**Código (Code)**
Signifigados	**Significados (Meanings)**	**Cama (Bed)**	**Gama (Range)**
Agredito	**Acredito (Believe)**	Bricassem	**Brigassem (Quarreled)**
		Conjucação	**Conjugação (Conjugation)**

***Table 4**: [g] instead of [k] and [k] instead of [t]*

When [b] becomes a [p]	Correct word	When [p] becomes a [b]	Correct word
Pompo	**Bombo (Drum)**	Exemblo	**Exemplo (Example)**
Bote (Smal boat)	**Pote (Pot)**		
Pico (peak)	**Bico (Nozzle)**		
Recepe	**Recebe (Receives)**		

***Table 5**: [p] in place of [b] and [b] in place of [p]*

When [l] becomes a [r]	Correct word	When [r] becomes a [l]	Correct word
Simpres	**Simples (Simple)**	Memolizar	**Memorizar (Remember)**
Aperativa	**Apelativa (Appealing)**	Pobleza	**Pobreza (Poverty)**
Faram	**Falam (Speak)**	Valiação	**Variação (Variation)**
		Dola	**Dora (Dora)**

***Table 6:** [r] in place of [l] and [l] in place of [r]*

Observation and Results

First of all, it is necessary to refer that this is a pilot study which has to be complemented with a wider corpus for written problems, oral misunderstood and perception discrimination difficulties. Meaning that a complete study where it can be analyzed the 3 major skills of the students and understand if they are exactly the same or if it varies according to the task they are performing.

It is known that German, English or French learners do not have this kind of problems in what concerns to those consonants. Yet, Spanish learners of Portuguese, for instance, due to the proximity between both languages, show difficulties in terms of perception of minimal pairs, namely in what concerns to vowels. According to Nunes et al. (2006) the proximity of languages can represent an obstacle to the acquisition of a foreign language. Phonological similarities favor transfer.

The results show a clear difference on the number of words, therefore more problems with those pairs, on distinguish the pair [d], [t] followed by the pair [k], [g] and [l], [r]. It is also necessary to analyze the context of occurrence, which was not in study here. Nevertheless it is possible to observe that the biggest problems are on differentiating [d] and [t] and it can be seen that all this changes and misunderstood can cause communication problems and difficulties, once that some words only changing that consonant have a complete different meaning, and others do not even exist in European Portuguese. The next step it will be to study in an accurate study if this problem co-exist on perception and orally and in all this performances in which contexts are they prevalent (CVC, CCV or initial context).

Conclusion

The results, though not very representative, may show already that there is interference from the Chinese phonetic system on the production of certain Portuguese sounds. Studies on the acquisition of phonetic aspects of a Second language are important once that they bring to our knowledge some patterns of production and perception that researchers and Professors can work with and try to implement and or modify in order to improve students acquisition.

It has to be stated that studies contemplating the acquisition of Portuguese language by Chinese and Cantonese speakers is still very scarce, so what we may have here it is probably a beginning of research on this field.

A work of this nature may well help both teachers and students and it is also necessary to the scientific community serving to know better and understand the differences and similarities of these two languages that can signify an obstacle on the acquisition of a second language.

Adding to this conclusion it was found interesting to summarize some recommendations on how to acquire a good pronunciation and accent as stated by Bickford and Floyd, 2006. A person who wants to learn and speak a language with a near native speakers accent need to persistently pay attention on three basic aspects:

“Must listen attentively”- in all situations the learner must listen all the sounds and sentences melodies of the foreign language;

“Must learn to be a mimic”- In a foreign language the more we can mimic the native speakers and the closer we can come to that pronunciation the better;

“Learn how sounds are made’- If we know how the sounds of our native language are made we can make a transfer from them to the ones of the foreign language we’re learning;

‘’Readjust the habits’- In order to switch from our native language to the ‘new’ one we should be prepared to learn articulatory placements and know well the differences between the two languages.

Those strategies are all welcome and should be use frequently in the classroom context, when our main goal is to give the necessary confidence to the learners and make them become more fluent on a foreign language.

Future Work

As it was already referred, it is intended to create a larger *corpus* based on the information that was found in this preliminary study. This new *corpus* will be more vast with several and different examples of all the minimal pairs and contexts (words and text), taking also in consideration the presence or absent of stressed or unstressed vowels and even its articulation.

It will be important to test not only written production but also perception and oral performances and compare the results of all the tasks. Comparing results of each test between students from the very first year and the third and fourth year on Portuguese studies, it will also be interesting to compare if Mandarin and Cantonese speakers present the same difficulties and how do they improve over the years.

ISSN 2348-3024

References:

1. Ball, Martin J., Rahilly, Joan, (2009), Phonetics – The Science of Speech, Hodder Education.
2. Bauer, Robert S.; Benedict, Paul K., Modern Cantonese Phonology, Trends in Linguistics. Studies and monographs [TILSM], Mouton de Gruyter, Berlin, 1997.
3. Bickford, Anita C.; Floyd, Rick, (2006) Articulatory Phonetics-tools for analyzing the world's languages, fourth Edition, SIL International, Dallas, Texas.
4. Cholin, Joana; Levelt, Willem J. M., Effects of syllable preparation and syllable frequency in speech production: Further evidence for syllabic units at a post-lexical level, Language and Cognitive Processes, 24, pp.662-684, Psychology Press, Taylor and Francis group, 2009.
5. Doughty, Catherine J, Instructed SLA: Constraints, Compensations, and Enhancement, pp.256-310, The Handbook of Second language acquisition, edited by, Catherine J. Doughty and Michael H. Long, Blackwell publishing, 2003.
6. Duanmu, San, The Phonology of Standard Chinese, Oxford University Press, Second edition, 2007.
7. Fowler, Carol A., Galanticci, Bruno, The Relation of Speech Perception and Speech Production, pp.633-652, The Handbook of Speech Perception, Blackwell publishing, 2008.
8. Gass, Susan M., Schachter, Jacquelyn, Linguistic Perspectives on Second Language acquisition, Cambridge Applied Linguistics, 1989.
9. Gui, Ming Chao, The phonology of Gangzhou Cantonese, Munchen:Lincom Europa, 2005.
10. Hayes-Harb, Rachel, Lexical and statistical evidence in the acquisition of second language acquisition of second language phonemes, Second Language research, 23, pp.65-94, SAGE publications, 2007.
11. Labov, William, Sociolinguistics Patterns, University of Pennsylvania Press, Inc. 1991.
12. Laver, J. Principles of phonetics, Cambridge: Cambridge University Press, 1994.
    a. Livant, Mary, Meeting the challenges, The Bridge: From Research to Practice, May 2006.
    b. Martins, Maria R. Delgado, Fon[etica do Portugu"es, Trinta anos de investiga;'ao, Caminho, 2002.
13. Nunes, Ana Magarida Belém, Martins, Custódio, 2013, Perception of European Portuguese minimal pairs by Chinese Speakers – first approaches, Linguistic Studies of Human Language Book, Chapter III, 157-148, ISBN: 978-960-9549-45-5, ATINER.
    a. O`Brien, Irena; Segalowitz, Norman; Collentine, Joe; Freed, Barbara; Collentine, Phonological memory and lexical narrative, and grammatical skills in second language oral production by adult learners, Applied Psycholinguistics 27, pp.377-402, 2006.
    b. Pisoni, David, B.; Remez, Robert E., The Handbook of Speech Perception, Blackwell Publishing, 2005.
    c. Scott, Sophie K., The Neurobiology of Speech Perception, Twenty first century psycholinguistics, tour cornerstones, edited by Anne Cutler, 2005.
    d. Shi, Li Chin, Chinese phonetic system and language (English translation), Reprint, Second Edition, Commercial Press, Limited, Shangai, 1922.
    e. Zhu, XiaNong, A Fon[etica, Beijing, The Commercial Press, 2010.