Interlanguage Phonology:
Implications for a Remedial Pronunciation Course
for Chinese Learners of English

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0. Introduction

Adult Chinese students coming to Europe to start on or further their academic career in an English-speaking environment, very often face problems understanding the target language (perception) or making themselves understood (production). This leads to communication problems in almost all communicative settings. An impressionistic analysis of the interlanguage of a group of 19 learners showed serious deviations from the target language. Consequently, the learners were perceived as unintelligent, stubborn and malfunctioning by people in their academic and administrative environments. In other words, the Chinese students' foreign accent negatively affects their academic performance and stigmatises them socially (Verhoeven & Van de Poel 1994). This social disadvantage is caused by a complex of factors, the most basic of which is that the Chinese phonological system differs strongly from English. Moreover, L1-transfer is almost stereotypical for the entire group (Kenworthy, 1999).

When trying to remedy phonetically-phonologically, several factors seem to hinder this process. Even though the students have had at least six years of English classes in secondary school (6 hours a week), their phonetic knowledge of and skills in English are highly deficient and their phonetic errors are deeply rooted (fossilised). This may be due to the fact that the teaching of the English pronunciation has been approached solely through a Chinese phonological system. Contrastive analysis or error analysis, etc. are not familiar to them. Secondly, there seems to be an attitudinal aspect to it, in that the learners are not aware of their inaccurate phonetic performance. Substantial awareness raising is required to provide this insight. On an altogether different level, the students' learning strategies seem to be fragmentary and one-sided. They cover a very narrow range of learning routes, linked to choral teaching and continuously looking up (faulty) transcriptions in electronic dictionaries, without any form of reflection. Thus, also in this respect fossilisation can be observed.

A fourth problem concerning efficient communication is that phonetic problems may increase as a result of culture shock, i.e. the 'unsettling' socio-cultural experience of

learners when coming to Belgium. They come from a different pedagogical culture, where respect, authority, learning autonomy, initiative and individuality are approached differently, and at first the new learning environment seems to stop the language learning process, including pronunciation.

When trying to devise a remedial phonetic programme, several conditions will have to be met. In a first instance, a phonetic inventory of the native language (L1 Chinese) and a detailed description of the learners' interlanguage accent (L2 English) should be brought together in a database for easy reference. Secondly, the learners' socio-cultural background as well as their pedagogical history have to be carefully looked into.

On the basis of an in-depth phonetic and pedagogical needs analysis and after a one-year pilot study we believe that such a programme should heavily rely on the basic phonetic principle as summarised in the Motor Theory of Speech Perception, i.e. that people cannot hear what they cannot produce and they cannot produce what they cannot hear (Liberman & Mattingly, 1985). The crux of this theory is that foreign sounds are perceived more easily when students are able to produce them correctly. Therefore, this approach will offer the learners perception as well as production modules in meaningful contexts. In our experience, systematic and intensive pronunciation training as a distinctive component in an academic language programme seems to overcome some of the phonetic and pedagogical fossilisation: this is crucial for the social functioning of these people.

This study is both descriptive and explanatory in that it provides a phonetic description of Chinese[1] (L1) as opposed to English (L2) but it also gives an account of a one-year remedial phonetic pilot project. This article has four objectives: in the first instance, it is attempted to provide a detailed description of L1-L2 discrepancies (Chinese - 'European' English) and to systematically highlight L1-L2 transfer. Secondly, the factors influencing the phonetic and pedagogic deviations are inventorised. Thirdly, ways of pronunciation improvement are suggested. Finally, the findings of the one-year pilot project are reported.

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[1] Chinese is the largest language in the world, spoken by more than a thousand million people. It consists of eight different dialect groups, which differ greatly in vocabulary and grammar. Putonghua ('Common language') is the variety chosen as standard for the whole of China, and widely promulgated under this name after the foundation of the People's Republic of China in 1949. Putonghua embodies the pronunciation of Beijing, the grammar of the Mandarin dialects, and the vocabulary of colloquial Chinese literature. In 1956, it became the medium of instruction in all schools, and a policy of promoting its use began. It is now the most widely used form of spoken Chinese, and is the normal written medium for almost all kinds of publication (Crystal, 1997). The participants in this project come from different dialect groups of Chinese, but they use Putonghua when they communicate with one another.

1. Materials

In the course of one academic year (2000-2001) 19 Chinese undergraduates at Antwerp University were observed in their perception and production of English. All of the participants were enrolled for a one-year preparatory programme in English for Academic Purposes. Most of them (15) passed the final exams successfully and went on to study in English.

Four types of pronunciation data were collected in consecutive stages. At the beginning of the academic year, one group of students 1 (N=7) was interviewed by a panel of 3 lecturers. The questions asked covered a broad range of linguistic functions. The conversations were recorded: the recordings were analysed impressionistically.

The second set of audio recordings of a new group of students (N=12) were made in a recording studio. The students were asked to reply to some simple questions and to read a text aloud. The data collection was transcribed phonetically in IPA by one author, and a contrastive analysis was made.

In the third instance, additional classroom observations were done in the course of the academic year to study the pattern of the L1-L2 transfer more closely. Thus, a more balanced picture of the phonetic/phonological problems was obtained. It also provided an insight into which strategies the students activate to solve transfer problems.

Finally, a small representative sample of the students' speech was audiotaped (from the second group, N=10) eight months after starting their studies in Antwerp in order to get a longitudinal picture of progress made.

2. Presentation of the data

The Chinese phonological system differs from English both on a segmental and suprasegmental level. Based on descriptions of the Chinese and the English phonological systems (Kenworthy, 1999; Handbook of the International Phonetic Association, 1999), a contrastive analysis was carried out.

A description of the phoneme inventory of the learners' native language is not enough to give a complete overview of the problems to be predicted in the learners' target language. A description of the syllable structure and the prosody is necessary to complete the picture. Nevertheless, the phoneme inventory can give an indication of some of the expected problems. 'Positive' transfer implies that the same sound exists in L1 and L2, and will not cause difficulties. 'Negative' transfer means that a sound will be difficult to pronounce, since it does not exist in L1.

2.1. Contrastive analysis of English and Chinese vowels

Table 1: Transfer table of Chinese and English vowels.

Chinese		English		Transfer
i	Ĭ	i	i:	positive
y	y̆			none
E	Ĕ	e	Œ	negative
ø	ø̆	Q		negative
a	ă	Å	Ă	negative
ç	ç̆	ç̆		positive
u	ŭ	u		positive
I	I	I	I	positive
P	P	´		negative
å	å	√		negative
U	U	U		positive

Table 1 gives an overview of the L1-L2 discrepancies for the vowels. [i] and [I] are separate phonemes in Chinese and students should not have any problems in producing these sounds. Our recordings, though, give another picture. The learners tend to diphthongize [I] when followed by [l,t,d,m], e.g. 'fill' may sound like [feil]. This pattern shows that the context in which the sound occurs has an influence, even though the sound itself does not cause any problems.

Chinese does not have the phoneme [e], the learners replace the sound with the more open [E] or with a diphthong; 'friend' sounds like [»f®ăIn].

The learners have problems distinguishing the vowels [Q] as in /bad/, [ç] as in /pod/ and [√] as in /bud/. When [√] occurs in the first syllable of a bisyllabic word, [√] is always diphthongized; 'brother' will sound like [»brouD´].

2.2. Contrastive analysis of English and Chinese diphthongs

Table 2: Transfer table of Chinese and English diphthongs.

Chinese	English	Transfer
`ai    a˘I`	`a˘I`	positive
`åi`		none
`au    a˘u`	`a U`	positive
`åu`		none
`ei`	`e I`	positive
`Eu    E˘u`		none
	`´  U`	negative
	`i´`	negative
	`E´`	negative
	`U´`	negative
`Py`		none
`çi    ç˘I`	`ç I`	positive
`ui    u˘I`		none
`iu    i˘u`		none
`ou`	`ou`	positive

Table 2 above indicates that both Chinese and English have a large number of diphthongs, which might suggest that few difficulties should be expected here. According to the table, Chinese speakers will have problems with the sounds `[´U,i´,E´,U´]`, however the learners seem to manage them very well.

2.3. Contrastive analysis of English and Chinese consonants
2.3.1. Plosives

Table 3: Transfer table of Chinese and English plosives.

Chinese	English	Transfer
`p`	`p`	positive
`pH`		negative
	`b`	negative
`t`	`t`	positive

Chinese	English	Transfer
tH		negative
	d	negative
k	k	positive
kH		negative
	g	negative
kW		negative
kWH		negative

It can be seen that Chinese does not have voiced counterparts for [p,t,k], but it has aspirated plosives. Investigation shows that aspiration is the distinctive feature between [p,t,k] and [b,d,g] in English, not voicing (Handbook of the International Phonetic Association, 1999).

English [b,d,g] have little or no voicing during the stop closure, except when between voiced sounds. This means that when the Chinese speakers transfer their unaspirated plosives [p,t and k] to English, they may be perceived as the voiced counterparts [b,d and g]. The phonemes [p,t and k] are unreleased in syllable final position in Chinese. Chinese learners transfer these articulatory habits to English, and consequently these sounds seem to be 'swallowed' and the English-speaking listener may have difficulty perceiving which sound was produced. What is even more frequent is that the learners add [´] after the voiceless plosive in word-final position: 'stop' becomes [»stop´] (like French speakers of English tend to do).

2.3.2. Fricatives

Table 4: Transfer table of Chinese and English fricatives.

Chinese	English	Transfer
f	f	positive
	v	negative
	T	negative
	D	negative
s	s	positive
	z	negative
ts		none
tsH		none

Chinese	English	Transfer
tS	tS	positive
	dZ	negative
	S	negative
	Z	negative
h	h	positive

Chinese does not have either of the dental fricatives. The students substitute [s], [t] or [f] for [T], which is a very common transfer for other languages as well. They substitute [l], [d] or [v] for [D]; /thing/ is pronounced [»siN] and /this/ can sound like [»lIs].

This seems to suggest that they pick up the parameter of voicing in some way. Voiceless [T] is replaced by a voiceless sound and voiced [D] is replaced by a voiced sound. Place of articulation seems the more difficult parameter. Some of the learners also have a strong interdental [s]. [f] and [v] substitutes also cause problems. From table 4 it is clear that Chinese does not have any voiced fricatives. The students substitute differently in syllable initial and syllable final position. In syllable final position, the learners substitute [f] for [v]; 'save' sounds like 'safe', as Dutch speakers of English do. Syllable initially, the learners tend to substitute [w] for [v]; 'vine' will sound like 'wine'. In bisyllabic words where [v] is initial in the second syllable, it is also pronounced [w]; `ever` sounds like [»ew´].

[tS] does occur in Chinese, but [dZ] does not. The learners are not able to distinguish or produce a difference between 'choy' and 'joy' (initial position) or 'rich' and 'ridge' (final position). The phoneme [S] does not exist in Chinese. The learners substitute [s] for this sound; perceptual confusion occurs in pairs like 'see' and 'she', 'same' and 'shame'. What makes it even more complicated, is that, in Chinese, [S] is a variant of [s] before the vowel [u], so they will pronounce 'Sue' as 'shoe'. This indicates that a pronunciation problem is not always producing the sound itself, but deciding what sound comes next. This is related to syllable structure.

2.3.3. Nasals

Table 5 suggests that there shouldn't be any problems with the nasals, but it has to be mentioned that [n] rarely occurs in syllable-initial position in Chinese and syllable-initial [N] is often deleted. The last case does not cause a problem, because [N] does not occur syllable initially in English. However, [n]-deletion at the beginning of a word like 'never' can be expected. The students tend to replace another sound, [l], for initial [n] instead of deleting it.

Table 5: Transfer table of Chinese and English nasals.

Chinese	English	Transfer
m	m	positive
n	n	positive
N	N	positive

2.3.4. Liquids

Table 6: Transfer table of Chinese and English liquids.

Chinese	English	Transfer
l	l	positive
	®	negative

There is a well-known perceptual confusion and production difficulty between [l] and [(®)]. The Chinese learners tend to use a sound which sounds most like an [(®)] to the English ear for both sounds in final position: e.g. 'all' might sound like 'or'. In the word 'hair', however, the [(®)] will be pronounced correctly.

In initial position, [l] is often substituted for [(r)]: e.g. 'ride' might sound like 'lied'.

When [l] occurs in a consonant cluster in English, the learners replace it by another phoneme, or they simply delete it: e.g. 'blue might sound like 'brew'.

2.3.5. Approximants

Table 7: Transfer table of Chinese and English approximants.

Chinese	English	Transfer
j	j	positive
w	w	positive

The approximants do not cause any transfer problems.

2.4. The syllable

In addition to a description of the phoneme inventory of both languages, a description is required of what happens when sounds are combined in larger units. Languages differ in what and how much they include in a syllable, and in how the phonemes are organised within the syllable. When Chinese students learn English at school, they relate their pronunciation to their syllable system. This means that the students have problems in pronouncing syllables which are not part of their system. Chinese syllable structure is simpler than in English. The phonotactic structure of Chinese syllables is (C)V(V)(C) where parentheses indicate optional elements. In English it is possible to have sequences of up to three consonants in syllable initial and four in final position. Consonant clusters are therefore difficult for the Chinese students. The learners modify the complex syllable structures to make them conform to their present level of phonetic ability. Underlying this description there are two basic principles along which Chinese learners seem to operate. Since there is a tendency of Chinese syllable structure to avoid consonant clusters, these clusters tend to be simplified. The most frequent syllable simplification is consonant deletion:

- Word initial consonant cluster: The learners tend to delete [r] when it follows bilabial plosives: /brother/ may sound like [»b√D´].
- Word medial consonant cluster: The consonants most often deleted are [r,l,t,d,f,v] especially when these sounds occur after a vowel: /older/ may sound like [odder].
- Word final consonant cluster: Deletion is also used in consonant clusters word finally; the most frequently deleted consonants are [r,l,t,d,f,v], for example /bold/ becomes [b´U].

The second strategy is diphthongisation of vowels:

/brother/ is pronounced [b®aID´]

/bread/ is pronounced [»b®aId]

Chinese and English differ in the distribution of phonemes in syllable structure. The tendency of Chinese is to have a word-final vowel. This leads to word-final consonant deletion or vowel epenthesis.

- Final consonant deletion:

/stop/ sounds like [»stÅ]

/school/ sounds like [»sku˘]

- Vowel epenthesis:

/stop/ sounds like [»stÅp´]

/yes/ sounds like [»jez´]

In the last example, the fricative has become voiced in addition to vowel epenthesis.

The fact that the Chinese syllable is simple and that the distribution rules are different from English indicates that, and explains why, the Chinese learners of English are facing problems in their pronunciation of English. The result of the difficulties with consonant clusters is that the borders between the words are poorly marked and it is difficult to understand the speech.

2.5. Rhythm and stress

Chinese is a tone language; tone operates lexically to vary meaning. Four contrastive tones are generally accepted in Mandarin Chinese today. The tones, which are pitch variations, are linked to the syllable; the sequence /ma/ can be pronounced with 4 different tones where each of them has a different meaning: 'horse', 'mother', 'weed' and 'to swear'.

The English stress pattern is related to syllable length, loudness and pitch. There is a strong distinction between stressed and unstressed syllables in words, with stressed syllables being longer, louder and with a higher pitch. Longer words frequently have one or more syllables with a secondary stress. English uses sentence intonation, a continuous changing of the pitch, to express meanings. Chinese learners have problems with the alternation between stressed and unstressed syllables in English. Their solution is to produce every syllable with the same amount of stress, or simply to delete the unstressed syllables as a result of perceptual influence.

2.6. Sentence intonation

Intonation is tonal variation in utterances used to express meaning. The intonation patterns may differ from language to language and from dialect to dialect. Speakers also change their intonation according to the situation or the listeners. Intonation is one of the factors, which reveals that a speaker is not native, because it is frequently transferred from the speakers' native language. Because Chinese is a tone language, speakers are very sensitive to changes of pitch in speech, but they are used to hearing pitch changes over single syllables, rather than over longer units. The consequence is that English intonation produced by the Chinese speakers sounds staccato and monotone. In English, declarative sentences and question-word questions have a falling intonation pattern, while polar questions (answerable by 'yes' or 'no') have a rising intonation. Pitch changes occur over a single syllable in Chinese and there is no sentence question intonation. The consequence is that the students transfer the Chinese system to the English question sentences: they stress and raise the pitch of the question word and the pronoun in the sentence and leave the rest of the sentence monotone:

Can I have a copy of this exercise?

Shall we meet on Thursday?

2.7. Findings

Learning the sound system of a language entails more than just learning how to pronounce phonetic segments. The learners do not only have to adequately adjust to the segmental structure, the syllable structure, and the prosodic structure of the new phonology, the learners also have to use linguistic mechanisms to optimise lexical intelligibility. The language learners have to develop a linguistic knowledge that is recognised by the listener. The analysis has shown that the Chinese learners of English experience difficulties on a segmental level, in the syllable structure, and on word and sentence level. A short summary of the findings is given below.

2.7.1. Segmental level

- The analysis shows that the learners:
- Diphthongize the vowels [I, e, √] in certain consonant contexts.
- Pronounce the voiceless aspirated plosives as unaspirated.
- Add a schwa after voiceless plosives.
- Substitute [s], [t] or [f] for [T] and [l], [d] or [v] for [D].
- Substitute [f] for [v] in syllable final position, [w] for [v] initially.
- Mix up [tS] and [dZ].
- Substitute [s] for [S].
- Have a strong interdental [s].
- Substitute [l] for initial [n].
- Mix up [l] and [(®)]: [(®)] occurs in final position, [l] in initial position.
- Replace or delete [l] occurring in consonant by [(®)].

2.7.2. Syllable structure

As far as the syllable structure is concerned the learners:

- Use consonant deletion, vowel epenthesis and consonant replacement to modify complex syllable structures.
- Diphthongize vowels to facilitate the pronunciation of the consonant cluster.
- Substitute [(®)] for [l] in consonant clusters.
- Delete syllable final fricatives, affricates and plosives, pronounce the fricatives by adding a final vowel or replace them by another sound.

2.7.3. Tones/Stress

Chinese learners have problems with the alternation between stressed and unstressed syllables. They:

- Produce each syllable with the same amount of stress.
- Often delete the unstressed syllables.

2.7.4. Sentence intonation

Chinese speakers are sensitive to changes over a single syllable, rather than over longer units. As a consequence:

- The English intonation sounds staccato and monotone.
- In polar questions, learners stress and rise the pitch of the question word in the sentence and leave the rest of the sentence with a monotone intonation.

3. Trends in interlanguage phonology

In order to try to understand the findings discussed above, we turn to language learning theories and more in particular to interlanguage phonology. The study of interlanguage phonology has undergone considerable developments in the last decades, due to research in interlanguage phonology itself, as well as to research in related areas. Recent developments in linguistic theory, psychology, first language acquisition and technology in experimental phonetics have produced research, which a decade ago was neither possible nor even considered.

There does not seem to be any biological restriction for how many languages a person can learn, however, it seems impossible to obtain a native-like competence in the L2 when it comes to pronunciation, unless L2 is acquired as a child. Research shows that there are different factors that influence the achievement of pronunciation skills in foreign languages (Fletcher & Garman, 1986). Some factors seem to be language-independent while other factors are related to the speakers' mother tongue.

3.1. Language-independent factors

There are several language-independent factors involved in the acquisition of a new speech sound system. The most salient are: age, motor skills, perception, neurology, and psychological and social factors.

3.1.1. Age

The group of students studied here are between 18-23 years old. Thus, they have passed the 'critical period' for L2 acquisition. Lenneberg (1967) suggests that the age limit to acquire native-like proficiency in a second language lies around the time of puberty.

Because the neural system has lost its plasticity, it is difficult for the learner to obtain a native-like pronunciation after that time. Werker & Pegg (1992) however, do not relate pronunciation deficiency in a foreign language to physiological changes. They suggest that infants are able to process speech sounds, and that they between 7 and 12 months of age can identify all the speech sounds in the native language. According to Flege and Fletcher (1992), the age of second language acquisition has a strong influence on foreign accent. Children starting to acquire a second language before the age of six will not have a foreign accent.

3.1.2. Motor skills / Perception

Speaker's motor skills considerably influence the way in which speech is perceived. Speakers put together all the cues available in order to deduce the motor activity they would use to produce similar sounds. This notion is called the Motor Theory of Speech Perception (Liberman & Mattingly, 1985). According to this theory, people hear the difference between foreign sounds better when they are able to produce them correctly themselves. Good pronunciation is related to the ability to control the organs of speech. Muscles, all of which are under the general control of the brain, control the speech apparatus. As mentioned in 3.1.1, it is suggested that the ability to acquire new motor skills begins to decline somewhere around puberty. During the acquisition of the first language, perception is used to control and to generate sound production. Perception control becomes weaker as one gets older. This makes it more difficult to analyse the sound input and generate a correct motor pattern. The perceptual inability to hear foreign speech sounds accurately may be a contributing factor to the incorrect pronunciation of students, i.e. their production of English is 'coloured' by what they can perceive and the consequence is that they have a foreign accent. However, adult learners of a second language can still learn to discriminate foreign contrasts by training, but discrimination is influenced by the speakers' language background (Mackiewitz, 2001). Factors like attention, memory, feedback and decoding are important in the perception process.

3.1.3. Neurology

More than 100 muscles used for articulation become specialised when infants learn to speak. A special co-operation pattern between muscles of the tongue, lips, palate, mandibula, larynx and the respiratory organs develops and the patterns become automated. It is easier for the second language learner to use the 'old and fast' automated articulation patterns from the native language than new and slower patterns. The effort to learn to use them is considerable.

3.1.4. Personality

Native language accent is also tied to people's sense of identity and personality; likewise personality has been linked to pronunciation proficiency in an L2. On the continuum of heavy foreign accent to native-like accent, personality affects the learners' position on the continuum. Personality variables typically considered are self-esteem, risk-taking, anxiety, empathy and motivation. Students are expected to have a strong motivation to improve their English, but, even if motivation is strong, inhibition can block the learning process. Chinese students come from a culture where social rules are strictly, clearly defined and not questioned. Taking risks in a learning environment, for instance, can be frightening and will prevent the students from improvising and practising by imitating a sound which he is not sure how to pronounce.

3.1.5. Socio-cultural Aspects

The learners' cultural background plays an important role in the second language learning process. These students come from an academic system which is very different from the Belgian one. The English programmes in China focus on the teaching and studying of grammar. Reading, speaking and listening hardly get any attention. This is related to the fact that the number of students per class is very high, up to 60 students, which makes it difficult and time-consuming to work with production and perception. But more importantly, teachers are not trained to address language skills. The teacher has a strong autonomy, and the programmes are exam-oriented.

3.2. Language-dependent factors

The role of the native language has always been important in second language learning research. There is wide agreement that the native language has an influence on the acquisition of a foreign language (Lado, 1957; Flege, 1987). The influence is especially apparent in the pronunciation; lexical and syntactic transfer is seen as 'less disturbing' for the listener (Husby & Kløve, 1999).

3.2.1. Transfer and contrastive analysis

The awareness of the important role of transfer took the form of contrastive analysis (CA). The early version of CA claimed that all non-native deviations were due to interference or negative transfer from the native language (Weinreich, 1953). By contrastive analysis of two given languages, all the substitutions by speakers could be predicted. Lado's work, Linguistics Across Cultures (1957), was an attempt to explain and predict all substitutions based on native language transfer. Researchers seemed to

accept that all non-native substitutions were due to transfer. The more dissimilar the L2 is from the L1, the more difficult to learn. The consequence of this theory was that only the *different* areas in L1 and L2 were focused on in language training. There is little doubt that a learner's first language influences the acquisition of a second language. However, in the 1970s several problems with CA became apparent. CA could not explain why some errors did occur whereas others did not. In addition, there was an increasing awareness that transfer did not explain all substitutions.

3.2.2. Universal Grammar

While structuralists working with CA theory saw language acquisition as a set of habits, Chomsky (1959) claimed that children are born with a special ability to discover for themselves the underlying rules of a language system. This language acquisition device (LAD) can be described as an imaginary black box somewhere in the brain, containing the principles which are universal to all human languages. In more recent work (1986) Chomsky refers to children's innate endowment as Universal Grammar (UG). UG is considered to consist of a set of principles, which are common to all languages. What children have to learn, are the ways in which their own language uses these principles and the variations on those principles which may exist in a particular language.

Researchers working within the UG framework claim that many of the interesting substitutions cannot be explained by CA because they are not due to transfer from the native language. They argue that the substitutions occur because second language learners try to work out language rules. They claim that second language learning is a process of creative construction, where the learners construct and test different hypotheses. L1-L2 differences are neither necessary nor sufficient to explain errors in the learning process.

3.2.3. Markedness

One of the drawbacks of CA was its failure to predict the level of difficulty or order of acquisition. Eckman (1977) tried to rescue CA by adding the dimension of markedness. His hypothesis claims that markedness can predict the order of acquisition: Less marked phenomena are acquired before the more marked. While CA predicted that all differences between L1 and L2 cause difficulties, markedness predicted order of difficulty.

3.2.4. Universal developmental factors

Empirical studies showed that not all substitutions can be attributed to native language transfer. In 1971 Nemser reported that some Hungarian learners of English produced

sounds occurring neither in native English nor Hungarian. Such processes can be categorised as developmental because they are similar to processes occurring in native language acquisition. The processes disappear later on in the language acquisition process and (often) also in the language learning process.

3.3. Conclusion

Interlanguage phonology research has widened its scope from the early contrastive analysis approach, with the idea that all errors were due to native language transfer, to a more broadly based approach incorporating general linguistic theory. More recent research has taken into account developmental errors, which are not due to native language but rather to universal factors that occur both in first and second language acquisition.

4. Remedying foreigner accent

As mentioned earlier, the Chinese students in this study have learned English in terms of a Chinese phonological system and their learning strategies are stereotyped, homogenous and can be identified for the group as a whole. It is a challenge to improve their learning strategies by concentrating directly on the English system.

According to the Motor Theory of Speech Perception, perception is based on production, and the listener plays an active role in the perception process (this is a pedagogical and cultural problem, since the learners have not done this before). Listeners use their articulatory knowledge to decode sounds and thus make connection between the acoustic signal and the identification of the speech unit. By mentally redoing the articulatory movements of the speaker, listeners process speech signals. The problems in understanding a foreign language can partly be explained by the fact that listeners can not generate the articulatory pattern in the L2.

Therefore, it was hypothesised that a remedial phonetic programme based on auditory principles might trigger the students in perception as well as production. Additional communication training is indispensable and will strengthen the students' social and communicative skills, thus it will make it easier for them to master the various settings and interactions in the target language.

4.1. Teaching approach

The teaching programme has two main purposes: awareness-raising and practice. First, students are made aware of the fact that perception and production are of great importance for communication and that their skills are deficient but can be improved by insight and practice. The second purpose is to give students a varied pronunciation

course, which focuses on their specific problems and which provides good opportunities for contextual practice from the known to the unknown.

4.1.1. Identifying realistic goals

Several factors are important when identifying realistic goals for a pronunciation course. Traditionally, the goal of a pronunciation course was to obtain native-like pronunciation (Kenworthy, 1999), even though it was achieved by relatively few people. In the light of recent discussions on communication in an international context, it is now even regarded as an inappropriate goal for most learners. Native-like speech production is not essential for effective communication in the target-language environment.

A high degree of perfectionism in the learning-process can also be demotivating, rather than stimulating. Learners, who feel that they cannot attain the goal of native-like pronunciation, might give up before they have reached their level of competence. Knowing that adult learners of a second language will probably never obtain a native-like pronunciation because of language-independent factors, we should specify which goals have to be mastered before the learner is 'functionally competent':

- Functional Comprehension

The language learner should be able to make himself understood.

- Functional Communication

The language learner should be able to engage in the complex of communication with L1 and L2 speakers of the target language.

- Self-consciousness

The language learner has to trust himself and his communication skills in order to function as an adequate communicative partner.

- Modification Strategies

The language learner has to focus attention on his own language production. His skills should be such that he can adapt his own speech production in cases of misunderstanding or misinterpretation. Thus, he will activate communication strategies as competent learners do (Færch & Kasper, 1987).

4.1.2. Student-teacher responsibility

The teaching approach has to be learner-oriented, with the teacher as a professional guide. As discussed before, the students' motivation is important in the learning process. Motivation is closely related to attention and includes elements of choice and participation. Interest, relevance, expectation and result are keywords for building up students' motivation. The teacher can motivate students to reach the above objectives by creating a stimulating communication environment and giving them relevant feedback and support. The learning process should therefore focus on communication skills in addition to pronunciation. Too strong a focus on pronunciation in isolation can demotivate the students.

Knowledge about the learners' native language can help teachers to see patterns and understand the learners' errors. Teachers can also include the learners' knowledge about their own native language in the teaching/learning process. This can also be a motivation factor. Furthermore, the teaching programme should be characterised by contextualisation, task-based and relevant approach, personal monitoring progress (diary or portfolio) and feedback. Only in this way the learners can be guided in taking up responsibility of their own learning, which brings us back to learner-centredness.

4.1.3. Teaching Tools

In order to optimally and efficiently reach the objective of functional competence, several learning and teaching routes have to be explored. In our experience, the following tools can be successfully integrated in the learning process.

- Use of mirrors

Students have a small mirror to see their articulators while producing speech sounds. By using a bigger mirror, the teacher and the student can sit next to each other and compare movements. This makes it easier to control those aspects of articulation that can be visually observed such as lip rounding in vowels. An individualised and peer approach intensifies the learning process.

- Computer programs

Computer programs can be used to illustrate different aspects in spoken language. By using acoustic speech programmes, the learners can record speech and get a visualisation of their oral production. Vowel length, intonation, aspiration and fricatives will be the easiest to analyse for beginners. The recordings can also be compared with recordings of native speakers. So, individual problems are focused upon.

- Video

Use of video taping as part of the teaching programme makes it possible for the learner to evaluate his own communication in a more objective and detached way. Together with the teacher and/or the class, different aspects of speech production can be discussed, e.g. speech rate and use of visible articulators. If the need is there for a total depersonalisation and anonimity, a training tape of good and bad practice can be made.

- Transcription

Most students already know a phonetic transcription system. Thus IPA has been successfully integrated for illustrations and explanations. In this way, the teacher can describe the students' problem more quickly and precisely and teaching becomes more relevant. Moreover, the learners are urged to use the transcription also in other classes and circumstances.

4.2. Teaching materials: the cognitive component
In order to cater for all the above aspects and taking into account the relatively short time frame, a pronunciation course should include an explicit description of the system, possibly contrastive, and a skills or practice-component.

This first aspect addresses the cognitive learning component and consists of a presentation of the vocal organs and their functioning and an identification and description of the learners problems.

4.2.1 Presentation of the vocal organs and their functioning
An introduction in how the vocal organs work and how speech sounds are made may help the learners to understand the speech process better. Knowledge of the functioning of the vocal apparatus creates a reference frame for speech production. Relevant exercises include phonation and articulation of the sounds of the target language in isolation and in word context. By introducing existing words from the target language at this stage, there is a focus on communication already from the beginning.

4.2.2 Identification and description of the learners' problems
An explicit description of the learners' native language and knowledge about the contrastive problems will make it easier to develop a pedagogically relevant programme, which focuses on the problem areas only.

4.3 Teaching material: perception
The programme has to be pedagogically relevant. This has to be explained to the learners. A relevant teaching programme covers the segmental level, the sound

inventory of the target language, the syllable structure, word stress and intonation. Even though starting off in isolation, the above aspects should be contextualised as soon as possible. Perception and awareness should be trained. Teachers should contrast the target and the actual realisation of the pronunciation. Part of the role of the teacher is to help learners to perceive sounds. As mentioned earlier, learners will have a strong tendency to perceive the sounds of English in terms of the sounds of their native language. Adult learners of a second language have to go through the process of establishing new categories.

A perception programme should include the following components:

- An introduction to articulatory phonetics, which teaches the students about the speech organs and how speech sounds are made. The new sounds should be heard in contrast with the sounds of Chinese, so the learner can perceive and understand the difference between them.
- A language laboratory speech-training programme, which covers exercise material on segments, syllables, rhythm and intonation.
- An evaluative session in contact between teacher and learners.

4.3.1 Part I: Isolation

The learners will be introduced to all the sounds of English as produced by a 'native' speaker. An additional file should show how the sounds are represented orthographically.

4.3.2 Part II: Minimal pairs

Knowing that Chinese does not have a voicing contrast for plosives and fricatives, this contrast can be stressed by minimal pairs. Minimal pairs can also help the learners to distinguish laterals [l, (®)] and words with monothongs - diphthongs.

- Plosives and fricatives voiced: voiceless: Listen to the first sound in the two words and decide which one is voiced. Record your pronunciation of the two words.

Word I	**Word II**
Pete	beat
to	do
class	glass
fine	vine
Sue	zoo

- Laterals [l, (®)]: Listen to the two words and decide in which word you hear [l] and in which word you hear [®]. Record your pronunciation of the two words.

Word I	Word II
all	or
fall	far
ride	lied
raid	laid

- Monofthongs: diphthongs: Listen to the words and decide in which word you hear a monothong and in which word you hear a diphthong. Record your pronunciation of the two words.

Word I	Word II
taste	test
bite	bet

- The phonemes [T] and [D]: Listen to the words and decide in which word you hear a [T] and in which word you hear a (either) [s]/[f]/[t]. Record your pronunciation of the two words.

Word I	Word II
thing	sing
thin	Finn

- Listen to the words and decide in which word you hear a [D] and in which word you hear a (either) [l]/[d]/[v]. Record your pronunciation of the two words.

Word I	Word II
these	lease
other	odder

- The phonemes [tS] and [dZ]: Listen to the words and decide in which word you hear a [tS] and in which word you hear a [dZ]. Record your pronunciation of the two words.

Word I	Word II
choy	joy
chill	Jill

4.3.3 Part III: Syllables

In every language there are restrictions on groups of consonants that occur at the beginning and at the end of a word. The restriction can be on the number of consonants or on which consonants can co-occur and in what order. Chinese has a simple syllable structure and a lot of practice will be required.

▪ Start with clusters that might be easiest in terms of Chinese phonological system i.e. voiceless clusters.

▪ Initially separate clusters by introducing schwa, then gradually remove the schwa.

▪ Start with clusters of two consonants, increase gradually to four consonants.

Also work with other difficulties linked to the syllable:

▪ Syllable-final fricatives, affricates and plosives.

▪ Syllable-initial [n].

4.3.4 Part IV: Suprasegmentals: stress and intonation

All aspects of rhythm and stress, including word stress, are highly problematic for the learners and must be given high priority. Work with English homographs to introduce stress is useful. In the following example, the first syllable takes stress for nouns and the second syllable for verbs.

`record    re`cord

Having been introduced to word stress, learners will be ready to move on to the rhythm of English, which is characterised by the alternation of strong and weak syllables. Lines from the literature or proverbs can be recorded. Stress can be visualised using dots on words, with a heavy dot indicating primary stress, e.g.

● . . .

supermarket

As we have seen, intonation is not new for speakers of Chinese, but their use of intonation is different from the English use. It can be helpful to give the students perception exercises on tunes extended over a whole sentence (cf. Halliday, 1970). Perception practise on polar questions is also very important.

4.4 Teaching materials: production

The production process can be divided into different stages: reproduction, production and evaluation stages.

4.4.1 Reproduction stage

The reproduction stage focuses on imitation and reproduction of special features in the target language. A combination of perception training and reproduction exercises in a language laboratory helps the learner to become aware of, and practise the difficult areas. Nowadays, as is the case at Antwerp University, pc-applications serve the same purpose. The models prepared for perception can be used to develop exercises. It is necessary to include visual aspects in these exercises - seeing the shape of the lips or the amount of tension in the facial muscles may help in distinguishing one sound from another.

4.4.2 Production stage

In the production session, learners practise pronunciation by working with communicative exercises. The learning process consists of different phases, from imitation to natural speech.

- Imitation exercises

These will change the focus gradually from reproduction to production. The goal is to focus on controlled production of difficult features.

Making sounds and combinations of sounds in a new language can be fairly difficult. First, some directions in how and where the sounds should be pronounced can facilitate the process. Secondly, it can be helpful to explicitly refer to the learners' native language or to known sounds when trying to produce certain sounds.

- For plosives, the easiest way to enforce aspiration is to start with words where the voiceless aspirated plosive appears initially, preceding a front high vowel [i]. This means: working with words like [pi˘p], [ti˘k], [ki˘k] or making learners produce a word with an initial [h], before adding a plosive. E.g. to pronounce 'part' the learners are to make [p] and then say 'heart'.

- In the case of syllable final plosives, affricates and fricatives, the learners first produce the word with a final schwa and then gradually drop the schwa; /stop/ [»stÅp´´] ([»stÅp].
- To make learners perceive the difference between [r] and [l], it should be emphasized that for [r] the tip of the tongue never touches the roof of the mouth, for [l] it must touch the roof. To produce [r], the learners make [a] as in 'cat' and, as they do, curve the tip of the tongue slightly upwards.
- For the dental fricatives, the learners place the tip of the tongue between the upper and the lower front teeth, or gently bite the tip of the tongue. They push the air through trying to make a hissing sound - this will result in [T].

For [D], they make a 'buzzing' noise.

Chinese learners tend to replace postalveolar fricatives [S] and [Z] by [s]. So in training, they are asked to move the tongue a bit further back, and start to produce easy combinations where the fricatives precede front high vowels, like in /sheep, sheet/ or for the voiced fricative /vision/.

The consonant clusters need special attention. The consonant sequences that occur in English are to be expected. For example, for the difficult final cluster in 'against', an identical sequence can be found, such as 'one stop'. By practising the sequence, the production of the cluster may be facilitated.

- Controlled communication exercises

The aim in this phase is to reinforce the developed skills from the imitation exercises and use them in a context. The learners should be able to cope with the weak forms and the way they interact with the rhythm of English. One way of working on weak forms and rhythm is through activities built around 'unnatural speech'. The learners hear recorded sentences spoken in a very unnatural way, and they have to discuss how the pronunciation of the sentence needs to be changed to make a more natural sounding sentence. Thus, they adopt a reflective teaching role. This is problem solving.

To improve their intonation, the learners are asked to record spoken sentences and play them in class. Comparison with identical sentences from "native" speakers is carried out and the learners are asked to identify similarities and differences.

- Spontaneous speech exercises

The established patterns should be integrated in natural speech. Learners have to produce speech with a meaningful and realistic content. Discussions, presentations, interviews are good exercises, especially if and when they focus on topics which the group cares for and the basic vocabulary material has been dealt with in other classes.

Material is necessary to create situations, which can trigger spontaneous language and let the learners create stories.

4.5 Evaluation exercises

There are two types of evaluation: self-monitoring and external evaluation. At regular intervals in the learning process, the learners are asked to use the daily notes made in their portfolio to describe their progress. In other words, they carry out a self-evaluation. On the basis of a short communication exercise a formal error analysis is carried out by the teacher and presented as a SWOT-analysis to the entire group. Strengths, weaknesses (points to be worked on), opportunities (how to approach the problems), threats (how to avoid further pitfalls) are discussed. Finally, the cassette or video recorder is used to evaluate the learners' progress with respect to production and speech reception.

5. Discussion and perspectives

This paper has illustrated a case study of a group of Chinese students integrated in an English one-year preparatory academic programme. A study of the interlanguage phonology was carried out, where the L1-L2 discrepancies were described and the L1-L2 transfer was emphasised. We have seen that Chinese influences the students' interlanguage and that they have a strong foreign accent with far-reaching consequences. Several factors, language-independent as well as language dependent, seem to influence the students' interlanguage as far as pronunciation is concerned. Several of these factors have been examined, and ways for achieving an improved pronunciation have been proposed. Based on the findings, a model for a teaching programme in perception and production was drawn up.

5.1 Personality

The students' attitude and motivation have a strong influence on their ability to improve their English. Motivation has been present during the whole academic year, but new social rules and a new pedagogical system have made it difficult for the students to adapt. However, in the course of the academic year, the students have shown to be more willing to take risks and they seem more self-confident. Their initial kynetic giggles and smiles, perceived by western interactants as shyness, have gradually developed into more confident eye contact.

5.2 Socio-cultural aspects

The students come from a different pedagogical culture and it takes time to integrate in a new system where the methods and the goals are not the same as in China. Their all-knowing teacher is replaced by someone sharing in learning activities and promoting learning-by-doing. After several years of English studies in Chinese schools, they discover that their communication is deficient, since people do not understand their English and they have problems in understanding our English. A note from one of the students can illustrate that they are aware of the pedagogical and socio-cultural differences:

> "As teacher knew that we couldn't pronounce some syllables in right way, even my Chinese teacher couldn't also. So if a student only knew how to write a word and he didn't know how to read it, teacher wouldn't reproach him" (Bill).

5.3 Developmental progress

The perceptual inability with respect to English speech sounds was very strong in the beginning of the academic year. The students could not hear the difference between certain phonemes in English, e.g. [l,(®)]. One year later, the students' ability to discriminate the foreign contrasts has improved significantly. When their pronunciation is corrected, they are able to perceive the difference between the two phonemes and correct themselves.

It has been argued that a large amount of the pronunciation difficulties in the L2 can be explained by L1 transfer. Classroom observation and the last recordings made about a year after starting the programm show that all the students have made progress, but some more than others.

5.3.1 Segmental level

In the beginning of the academic year, all the students diphthongized certain vowels in certain syllable contexts, e.g. 'friend' would be pronounced [»f®aˇIn]. The last recordings show that some of the students (30 %) still use the simplifying strategy, while most of them have mastered this feature.

Substitution for the dental fricatives was a feature in all students' pronunciations in the beginning of the academic year. However, a change of strategy can be seen: the students who substituted [t] and [f] for [T], will now use [s] (30 %), and those who substituted [s] for [T] (70 %), are now in most cases able to pronounce the dental fricative correctly. The voiced counterpart, which used to be substituted for [l], [d] and [t], is now often pronounced [z].

The laterals [l] and [(®)] are still problematic for most of the students. Improvements can be seen perceptually, but the sounds are often still mixed up in production.

5.3.2 Syllable structure

Consonant clusters are still difficult. The most frequent syllable simplifications were consonant deletion, vowel epenthesis and diphthongization of vowels. The last one is now more frequently used than the two others (70 % of the cases). The fact that the students change their simplifying strategies indicates that they are going through different stages in their second language acquisition process and that there is developmental progress in their interlanguage. This process takes time and the change of strategies is a good indication that the students are on the right track.

5.3.3 Stress and intonation

The students show substantial improvements in the alternation between stressed and unstressed syllables. Whereas they used to produce every syllable with the same amount of stress, they are now able to vary pitch and syllable length.

Also the intonation pattern has improved, it is less monotone than in the beginning of the academic year. However, the polar questions remain problematic.

5.3.4 Inter-individual differences

Most of the substitutions are characteristic for the whole group, however, some inter-individual differences are still present. Some students have a strong interdental [s] when speaking English, whereas they use an alveolar [s] when they speak Chinese. This might be an example of developmental processes (Nemser, 1971). Most of the students substitute [s,t,f] for [T] and [l,d,v] for [D], while one student substitutes [l] for both fricatives. These substitutions still hinder effective communication.

5.4 Programme evaluation

Two goals were set for the teaching programme. The first was to make the students aware of the fact that perception and production is of great importance in communication. After some time in Belgium, the students were aware that an adequate pronunciation is important for their academic performance and their everyday life. The approach to pronunciation has been a new experience for the students, and whether the programme was successful or not depended on factors such as attitude and motivation.

Some students were more interested in the new speech community than others and they have integrated more easily. These students have also been more concerned about their pronunciation than the others. Their concerns are often expressed in statements about how bad their pronunciation is and in request for correction. Some of them also see that the way in which they speak results in irritation and misunderstanding on the part of the listener.

Other students showed a lack of motivation and seemed not to be willing to integrate into the new culture at the beginning of the academic year. In trying to affect the motivation and the concern for good pronunciation, the importance of good perception and production skills for ease of communication was stressed throughout the course. A second attempt has been to demonstrate concern for the students' pronunciation and their progress.

The second goal for the teaching programme was to give students an extensive pronunciation course, which improves their English. The pronunciation programme has taught the students about the vocal organs' function and how speech sounds are made, their specific problems have been classified and perception and production exercises have been given. The recordings which were made eights months later, show that not only speech itself has improved, but that the new knowledge has affected students' awareness and concern for pronunciation and that they more easily engage in conversation.

5.5 Perspectives

The programme is certainly open for improvement. Some of the results with some of the participants are "discouraging" to the teachers involved. However, because of changes in communicative attitudes, the positive outcome of a multi-faceted approach seems promising. The teaching of phonetics/pronunciation is more than teaching sounds in isolation. Teaching and learning languages is a holistic undertaking and therefore the teaching programme stresses socio-cultural, attitudinal and other aspects as well as phonetic knowledge and skills.

References

- Cheung, KL (1986). The phonology of the present day Cantonese. Unpublished doctoral dissertation: University College, London.
- Chomsky, N. (1959) Review of B. F. Skinner's Verbal Behaviour. Language, 35, 16-58.
- Chomsky, N. (1986). Knowledge of Languages: Its Nature, Origin and Use. Praeger, New York.

- Crystal, D. (1997). The Cambridge Encyclopedia of Language, second edition. Press Syndicate of the University of Cambridge.
- Eckman, F. (1977). Markedness and the contrastive analysis hypothesis. Language Learning, 27, 315-330.
- The International Phonetic Association (1999). Handbook of the International Phonetic Association. Cambridge University Press.
- Flege, J.E. (1987a). A critical period for learning to pronounce foreign languages. Applied Linguistics, 8, 162-177.
- Flege, J.E. & Fletcher, K. (1992). Talker and listener effects on degree of perceived accent. Journal of the Acoustical Society of America, 91, 370-389.
- Flege, J.E. & Hillebrand, J. (1984). Limits of phonetic accurancy in foreign language production. Journal of the Acoustical Society of America, 76, 708-721.
- Fletcher, P. & Garman, M. (1986). Language Acquisition. Studies in first language development. Cambridge University Press, Cambridge.
- Færch, C. & Kasper, G. (1983), Strategies in Interlanguage Communication. Longman, London.
- Gibbon et al. (1998). Clinical phonetics and linguistics. Ziegler, W. and Deger, K. Whurr Publishers.
- Halliday, M.A.K. (1970). A course in spoken English: Intonation. Oxford: University Press.
- Husby, O. and Kløve, M.H. (1998). Andrespråksfonologi. Teori og Metodikk. Ad Notam Gyldendal, Oslo.
- Kenworthy, Joanne (1999). Teaching English Pronunciation. Pearson Education Limited.
- Lado (1957) Linguistic Across Cultures. University of Michigan Press, Ann Arbor.
- Lenneberg, E. (1967). Biological Foundations of Language. John Wiley, New York.
- Liberman, A. M. & Mattingly, I. M. (1985). The motor theory of speech perception revised. Cognition, 21, 1-36.
- Lightbown, P. M. & Spada, N. (1999). How Languages are learned. Oxford Handbooks for Language Teachers, Oxford University Press.
- Mackiewitz, J. (2001). Address held during the final event for the European Year of Languages. Brussels: 3 december.
- Manne, G. & Helleland, H. (1991). Kommunikasjon i språkundervisningen. Forlaget Fag og Kultur a.s.
- Nemser, W. (1971). Approximative Systems of Foreign Language Learners. IRAL, Vol. IX/2, Julius Groos Verlag, Heidelberg. Reprinted in J. Richards: Error Analysis. Perspectives on Second Language Acquisition. Longman, London.

- Scovel, Thomas (1988). A Time to Speak: A Psycholinguistic Inquiry into the Critical Period for Human Speech. Cambridge: Newbury House.
- Steinberg, D. (1993). An Introduction to Psycholinguistics. Longman Group UK Limited.
- Verhoeven, J. & Van de Poel, K. (1994). Aspecten van buitenlanderaccent bij vreemdetaalverwerving. Wroclaw : Acta Universitatis Wratislaviensis, nr. 1651, pp. 304-311.
- Weinreich, U. (1953). Languages in contact. New York: Linguistic Circle of New York.
- Werker & Pegg (1992). Infant speech perception and phonological acquisition. From Ferguson, C.A., Menn, L. & Stoel-Gammon, C. Phonological Development: models, research, implications, 285-311. York Press, Timonium. Md.
- Yavas, Mehmet (1994). First and Second Language Phonology. Singular Publishing Group, Inc.