

A contrastive study of English and Chinese phonology: Special difficulties for young Chinese learners of English

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Abstract: *This article contrasts the phonology of English language and Standard Mandarin Chinese language, highlighting some of the phonological differences that may slow down the learning of English by young Chinese students (about 3-12 years old). This article also provides linguistically plausible accounts for some of the difficulties that Chinese students encounter in their English learning process. These difficulties are mainly rooted in English speakers being voicing-distinguishers and Chinese speakers being aspiration-distinguishers. The article concludes with countermeasures to deal with the special difficulties Chinese students face while learning English. The data for this article are taken from previous research and from direct observation of real English classes in China.*

Keywords: negative transfer, phonology, English learning, Chinese

INTRODUCTION

Many foreign teachers, while teaching young Chinese learners, have encountered cases when Chinese students produce one sound (phoneme) instead of another. For example: producing /w/ instead of /v/. Concerning this example, Chinese students produce /w/ instead of /v/ because the phoneme /v/ is not existent in Chinese language. Therefore, Chinese students accommodate for this phonetic gap by using the already available and existent phonemes in Chinese language.

An example that baffles both teachers and parents is when Chinese learners produce the /t/ sound instead of the /k/ sound. The question is: why do Chinese students produce /t/ instead of /k/ in some words despite the fact that both phonemes are existent in Chinese language? Another issue which has been encountered is that Chinese students

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produce the sound /p/ instead of /b/. Chinese students also hear the sound /b/ instead of /p/ when foreign teachers produce /p/ as in *pig*. The question is: why does this happen and what explanations are there for this issue? Before answering the question, it should be kept in mind that this issue applies to some students only and should not be taken as a problem that all Chinese learners go through while learning English language.

This paper will first give a brief description of the Chinese and English phonology. Secondly, it will describe the issues while giving accounts for them. Finally, the paper culminates with suggestions and countermeasures to deal with the issues. Before giving further accounts of the issue, the phonology of Chinese and English languages will be described and contrasted first.

A Contrastive Analysis of English and Chinese Phonology:

English is an Indo-European language with a fusional system. English has 24 consonant phonemes as the table shows below. Out of those 24 phonemes, 13 are not shared with Chinese. This may sound startling. Some would ask bafflingly: “isn’t the English /b/ the same as the Chinese /b/?” In any event, it should be kept in mind that “a phoneme is defined for a particular language by its phonetic variants and their distribution in that language. This means that the “same” phoneme is always pronounced somewhat differently in two different languages” (Defense Language Institute, 1974). Those subtle phonetic differences are the main reason why Chinese students have an accent while speaking English, and the same goes for English speakers speaking Chinese. If all phonemes in both English and Chinese had the same phonological features (voicing, aspiration, place and manner of articulation), both Chinese and English speakers would have the same accent.

As mentioned above, English language is a fusional language. This morphological characteristic bestows on English language phonological flexibility of having consonants occur in diverse environments. The following phonemes: /s/, /a/, /c/, and /t/ can be rearranged to make numerous English words: *cat, cats, at, sat, acts* and so on. It is also worth noting that English words can have almost all the consonants as finals. After looking up dictionaries, it is found that English words cannot end with the following sounds only: /h/, /j/, /q/, and /v/. Chinese language, on the other hand, lacks this feature. Chinese words can only have consonants /n/, [ŋ], and /r/ as finals, the rest are vowel finals.

Another feature of English phonology that is contrastive to Chinese phonology is that stops, affricates, and fricatives come in two sets: voiced and voiceless. Chinese stops, affricates, and fricatives are all “voiceless”. Officially, unaspirated [t] and [k] do not exist in English. However, the phonemes /t/ and /k/ change their manner of aspiration depending on the environment they take place at. When it is preceded by a fricative or

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 a voiceless stop, the phonemes /t/ and /k/ are unaspirated. For example: *stop*, *after*, and *score*. That is to say, the aspirated and unaspirated [t] and [k] are allophones of the phonemes /t/ and /k/, respectively.

Manner of Articulation		Place of Articulation						
		Both Lips (bilabial)	Lower Lip and Upper Teeth (labiodental)	Tip of Tongue and Teeth (interdental)	Tip of Tongue and Tooth Ridge (apicoalveolar)	Front of Tongue and Hard Palate (laminoalveolar)	Back of Tongue and Soft Palate (dorsovelar)	Throat (glottal)
Stops	voiceless	p			t		k	
	voiced	(b)			(d)		(g)	
Affricates	voiceless					(tʃ)		
	voiced					(dʒ)		
Fricatives	voiceless		f	(θ)	s	(ʃ)		(h)
	voiced		(v)	(ð)	(z)	(ʒ)		
Nasals		m			n			
Lateral					l			
Semivowels		w			(r)	y		

Figure 1: Consonant Phonemes in English. Circled phonemes are not shared with Chinese. (table taken from Defense Language Institute).

Chinese language, on the other hand, is a Sino-Tibetan language with an analytic system. Chinese is also a syllabic language with a structure of three components: initial, final, and tone. Chinese language has 410 syllables. Each syllable is spoken with a different tone (LCRC, 2017). The initials are consonants while the finals are mainly vowels. These linguistic qualities foster stricter and limited flexibility for consonants to occur in different environments within word structure.

A very important contrastive trait that distinguishes the phonology of Chinese and English is, as aforementioned, the flexibility by which consonants take place within word structure- either as initials, medials, or finals. Chinese has 21 initials and 38 finals. Out of 38 finals, only 3 are consonant finals. The rest are vowel finals. Chinese language allows only for /n/, /ŋ/, and /r/ to play the role of consonant finals.

Initials			Finals in LCRC								
1	玻	b		Final	LCRC	Final	LCRC	Final	LCRC	Final	LCRC
2	坡	p	0			衣	i	烏	u	迂	v
3	摸	m	1	啊	a	呀	ia	蛙	ua		
4	佛	f	2	該	e	耶	ie			約	ve
5	得	d	3	喔	o	唷	io	窩	uo		
6	特	t	4	鵝	eh						
7	訥	n	5	兒	er						
8	勒	l	6	哀	ai			歪	uai		
9	哥	g	7	咳	ei			威	uei		
10	科	k	8	熬	au	腰	iau				
11	喝	h	9	歐	ou	憂	iou				
12	基	j	10	安	an			彎	uan		
13	欺	q	11	恩	un			溫	uun		
14	希	x	12	昂	ang	央	iang	汪	uang		
15	知	zh	13	鞞	ung			翁	uung		
16	蚩	ch	14	of 東	oung	雍	ioung				
17	詩	sh	15	(en)		烟	ien			冤	ven
18	日	r	16	(n)		因	in			暈	vn
19	資	z	17	(ng)		英	ing				
20	雌	c	<i>Note.</i> "oung" and "ioung" may be shortened as "oun" and "ioun" because there is almost no difference in sound effect.								
21	思	s									

Figure 2: Chinese Initials and Finals (LCRC, 2017).

From figure 3, it can be noted that out of 23 Chinese consonant phonemes, only 10 are shared with English. English consonants are distinguished by voicing, while Chinese consonants are distinguished by aspiration. For example: *pan* (half) / *p^han* (judge), *tan* (egg) / *t^han* (coal) and *kan* (do) / *k^han* (read) (Deterding; Nolan, 2017).

Chinese language has other phonological qualities that are totally different from English language. First, Chinese is a syllabic language. Chinese words are monosyllabic and are represented by characters that consist of initial, final, plus tone (Crystal, 2018). Chinese language, unlike English, has no consonant clusters as the English /*str*/ in *strong*. In addition, Chinese words end with the following consonants only: /*n*/, /*ŋ*/, and /*t*/. The following phonemes are not existent in Chinese language: /*v*/, /*z*/, /*ʃ*/, /*ʒ*/, /*tʃ*/, /*dʒ*/, /*θ*/, and /*ð*/ (Fang & Ping-an, 1992). Chinese students erroneously substitute the aforementioned English phonemes with the already existent counterpart phonemes in

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 Chinese language: /s/, /f/, /d/, /z/, and /w/. These differences are of vital importance to English teachers and must be heeded to when teaching.

Manner of Articulation \ Place of Articulation		Both Lips (bilabial)	Lower Lip and Upper Teeth (labiodental)	Tongue Tip and Teeth or Gum (apical)	Front of Tongue & Hard Palate (palatal)	Tongue Tip and Hard Palate (retroflex)	Back of Tongue & Soft Palate (velar)
Stops (all voiceless)	aspirated	p'		t'			k'
	unaspirated	(p)		(t)			(k)
Affricates (all voiceless)	aspirated			(ts')	(tʃ')	(tʃ')	
	unaspirated			(ts)	(tʃ)	(tʃ)	
Fricatives (all voiceless)			f	s	(ʃ)	(ʃ)	(x)
Nasals		m		n			ŋ
Lateral				l			
Continuants		(w)			(y)	(r)	

Figure 3: Consonant Phonemes of Mandarin Chinese. Circled phonemes are not shared with English. (table taken from Defense Language Institute).

Chinese consonants are described as “voiceless”. However, it must not be taken for granted that none of the Chinese consonants make the vocal cords vibrate at all. Voicing takes place along a continuum. There isn’t a language- as far as I researched- that has 0% voicing. Vocal cords are there for a purpose. They are like guitar strings. They vibrate and produce musical notes.

Chinese and English speakers took part in an experiment wherein they had to produce words recorded and represented by a spectrogram (Deterding & Nolan, 2017). The spectrogram record is analyzed according to: **A:** beginning of closure for plosives, **B:** end of voicing during the closure, **C:** end of closure for the plosive, and **D:** end of aspiration. The figures below are spectrograms of a Chinese speaker producing *pan* and an English speaker producing *bun*, respectively. The experiment found that the percentage of voicing during the closure for the Chinese plosives are lower (22%) than the English ones (65%).

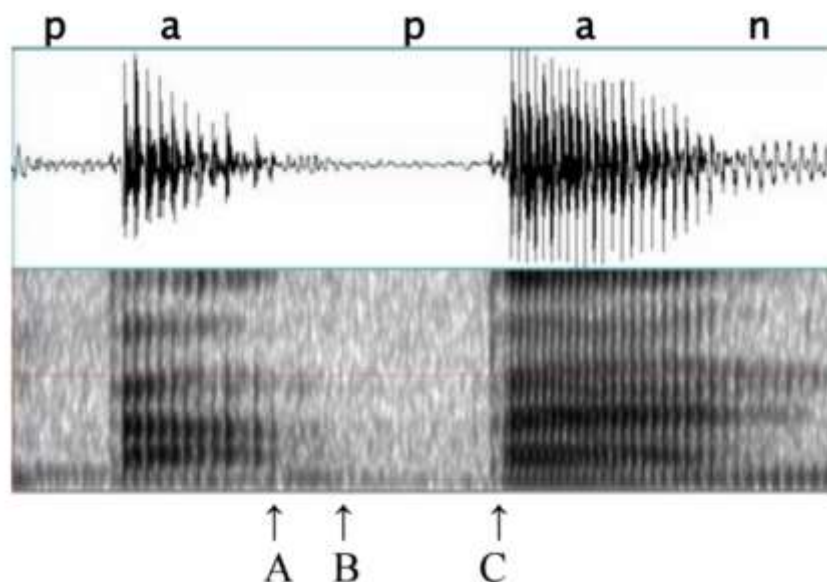


Figure 4: Voicing of *pan* by a Chinese Speaker (Deterding & Nolan, 2017).

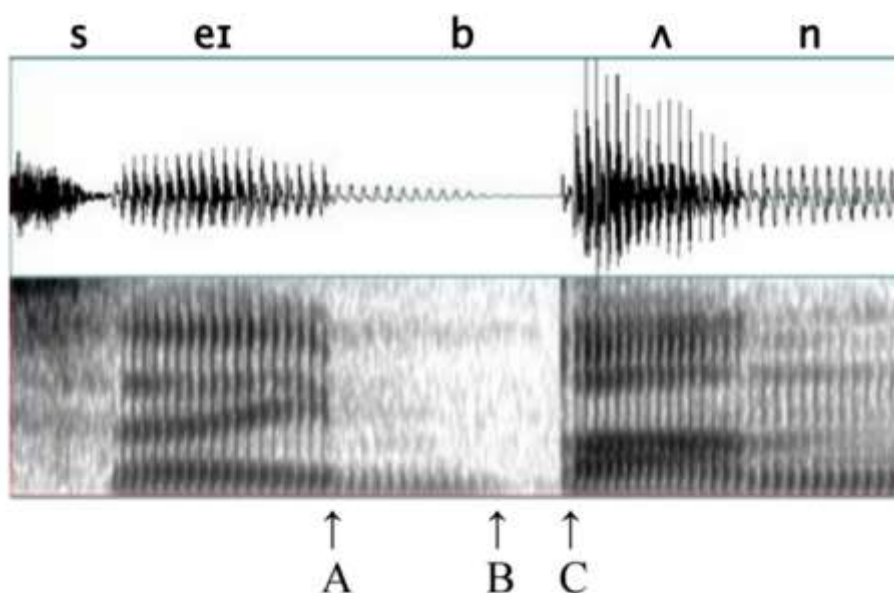


Figure 5: Voicing of *pun* by an English speaker (Deterding & Nolan, 2017).

The results of the experiment are summarized in the table below; which is taken from Deterding and Nolan (2017).

Voicing is really a matter of continuum. Although Chinese consonants are

Publication of the European Centre for Research Training and Development -UK differentiated in some linguistic literature according to aspiration, Chinese consonants still make use of voicing. However, the Chinese voicing is not that intense in comparison with English language.

	<i>Chinese</i>		<i>British</i>		<i>Signif.</i>
aspirated	/p ^h /	85.2	/p/	71.4	ns
	/t ^h /	85.6	/t/	80.4	ns
	/k ^h /	98.4	/k/	97.3	ns
	average	89.7		82.3	ns
unaspirated	/p/	11.0	/b/	11.0	ns
	/t/	13.6	/d/	17.7	*
	/k/	25.2	/g/	29.3	ns
	average	16.6		18.8	ns

Figure 6: Percentage of Voicing During the Closure for the Chinese and English Plosives.

Special Difficulties for Chinese Students:

Through direct participation and observation of English classes in China, many cases have been observed and reported- by English teachers- during which Chinese students face special difficulties in their spoken English. These difficulties seem to prolong which make Chinese parents concerned about the matter. The following cases are chosen as typical examples among others:

Case Study 1:

The issue of producing the sound /t/ instead of the final /k/ in words like *book* has been inquired by a parent of a 5-year-old student. The student, Jessica, used to have difficulties producing the sound /k/. For example: *Book*: /bʊt/ or *duck*: /dʌt/. This issue prolonged for months.

Case study 2:

Another case is reported by a teacher (Patricia) when a 5 year old student named Lucas mispronounces the same word *book* /bʊt/ instead of /bʊk/. The student is also said to have issues not just with final consonants, but also with initials. Instead of producing

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/kar/, Lucas would just pronounce it as */tar/*. Other examples include: *cat* as */tat/* instead of */kat/* or *bag* as */ba/* instead of */bag/*.

There are also other cases when Chinese students would just produce */p/* instead of */b/* or */t/* instead of */d/* or */k/* instead of */g/*. Foreign teachers would say “*pig*” or “*ten*” but Chinese students would receive it as */big/* and */ben/*, respectively.

The questions that arise here are the following:

Why do Chinese students prefer producing */t/* instead of */k/* as a final?

Why do Chinese students pronounce the word *bull* as *pull*?

Why do Chinese students perceive the word *pig* as *big*?

Speculative Accounts:

One of the reasons why Chinese students face difficulty when producing the sounds */t/* and */k/*- as well as other sounds- at the end of words is that Chinese words end mostly with vowels. The only consonant finals that occur at the end of Chinese words are */n/*, */ŋ/*, and */r/*. (see the table above). This unfamiliarity imposes a challenge for Chinese students in that they mis-produce */t/* for */k/* as finals in English words. This linguistic disparity between English and Chinese languages compels Chinese students to drop the consonant finals at the end of words. For example: *bag* would be produced as */ba/* but not as */bag/*.

Another plausible account for the difficulty of producing */t/* instead of */k/* has to do with the place of articulation. From observation, it is seen that many young students face the difficulty of backing their tongues to the soft palate (velum) to produce */k/*. Because of this, they prefer producing */t/* sound which is produced easily by placing the tip of the tongue near the alveolar ridge or even near the gum.

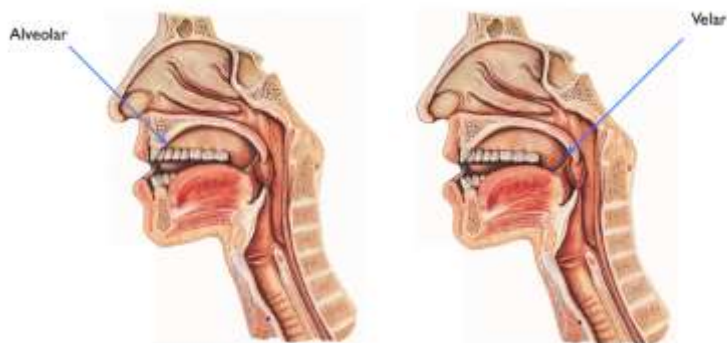


Figure 7: Place of Articulation of Alveolar and Velar sounds.

Figures from: <https://www.mimicmethod.com/ft101/place-of-articulation/>

However, there are cases during which Chinese students would pronounce *car* as /tɑ:/ instead of /kɑ:/ or *cat* as /tɑ:/ instead of /kɑ:/. This case has nothing to do with the position of the phoneme within word structure, since Chinese words do also have /k/ as initials as in *kan* (see). For Chinese students, /k/ and /t/ would sound the same since these phonemes are taken in with no clear phonetic receptive distinctions. Both /k/ and /t/ are voiceless. The only distinction between them is aspiration. Because of aspiration being the sole distinguisher, phonetic confusion is created among Chinese and English speakers over words that have plosive consonants. Further explanation is provided in the following paragraphs.

Chinese students receive words such as *pig* as *big* because Chinese language distinguishes /p/ from /b/ on the basis of aspiration only- and not on the basis of voicing. English language makes a voicing distinction between /b/ and /p/, the former is voiced, and the latter is unvoiced. In Chinese language, however, both /b/ and /p/ are “voiceless”. The only distinction between them is aspiration, the former is unaspirated, and the latter is aspirated. As it can be seen in figure 4, the phoneme /b/ is not listed. It could be said that [b] and [p^h] are allophones of the phoneme /p/. Therefore, when English teachers say *pig*, they produce /p/ with not too strong an aspiration. This makes it sound like a /b/ for Chinese students. It is proved, using spectrogram, that Chinese plosives have a longer aspiration than English ones (Deterding; Nolan, 2017). This problem arises, and sometimes, slows down the communication process because Chinese students are aspiration-distinguishers, while English teachers are voicing-distinguishers.

The same goes for the sounds /d/ and /t/. The phonemes [d] and [t^h] are also allophones of /t/ in Chinese language. When English teachers say “*time*”, Chinese students would receive it as “*dime*”. That transpires because English teachers would produce the /t/ in *time* with little aspiration which would result in Chinese students receiving it as /d/. Chinese speakers do differentiate between /d/ and /t/. However, the distinction is based on aspiration which is usually stronger than English speakers’ aspiration.

English speakers may not have any trouble in communication since English language makes distinction both on the level of aspiration and voicing. However, Chinese speakers will have communication barriers since Chinese language makes distinction on the level of aspiration only. For example: *top* with a strongly aspirated /t^h/ would be perceived as /t^hɑ:p/ by Chinese. Nevertheless, *do* or *time* would be perceived as /tu:/ and /dɑim/, respectively.

Some Chinese students pronounce words like *bull* as *pull*. Why does this happen? We

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already know that Chinese consonants are differentiated on the basis on aspiration only, while English consonants are distinguished on the basis of voicing. What happens here is that Chinese students associate their unaspirated stops (/p/, /t/, and /k/) with the English voiced unaspirated stops (/b/, /d/, and /g/), and hence *bill*, *do*, and *get* would be pronounced as *pill*, *to*, and *ket*, respectively. (Defense Language Institute, 1974).

Some language, like Chinese, differentiates its consonants on the basis of aspiration only. Because of this linguistic trait, other distinguisher terms (fortis and lenis) were coined to differentiate between consonants like /b/ and /p/ which do not involve voicing and cause confusion to other speakers. /b/ is said to be lenis because it is weakly and slackly articulated, while /p/ is fortis because it is strongly tensely articulated (Crystal, 2008). With these phonetically added distinctions, more confusion about the unvoiced /b/ and /p/ is mitigated.

Another reason why Chinese students perceive /d/ instead of /t/ is that the English /t/ and /d/ undergo flapping. These two sounds occur in the same environments in English. Both /t/ and /d/ take place between vowels (*better/ water*) or after an /r/ and before a vowel (*party, forty*). When /t/ and /d/ happen in those environments, flapping takes place resulting in an /r/ sound instead of /t/ and /d/. This happens by tapping the tongue against the alveolar ridge (Trask, 1996). Therefore, the /t/ and d/ in *better* and *water* are replaced by a flapped /r/ resulting in two identical words. It's no surprise that some online dictionaries transcribe *better* as /'bedər/. The following paragraphs deal with countermeasures that need be followed to reduce phonetic confusion and enhance English learning process.

Countermeasures:

The first step that needs to be taken by English teachers in overcoming the issues that students face with their spoken English is that teachers should be aware of the issues and the reasons behind them. Teachers should be researchers as well. By being open to linguistic research, teachers would be linguistically conscious about the errors and mistakes their students make. This linguistic knowledge will also equip teachers with tools needed to design spoken exercises for students.

Drills should be designed for students to practice using, for example, minimal pairs like *coat/ goat* and *blue/glue*. While practicing words with distinctive phonemes, teachers should be placing their hands on the place responsible for the articulation of those sounds. For example, a teacher may place their hand on the upper throat signaling that the sound is from the velum. A teacher may also exaggerate the pronunciation of the phoneme /t/ by showing students the tip of the tongue touching the alveolar ridge.

To also clear the confusion between English voiced stops like /b/ and Chinese voiceless

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aspirated stops like /p/, teachers need produce words like *pencil* accompanied with a strong puff of air; otherwise, it would sound as /b/ to Chinese. This may, supposedly, lead to distorting the actual English pronunciation of the word *pencil*. But this may be done for some Chinese students who are still in the stage during which they are unable to discern the English /b/ from /p/.

For Chinese students who find it difficult to produce words that contain the velar sounds (e.g. /k/) as in *book*, it may actually take them months to have them produce *book* perfectly. Speaking drills with bodily exaggeration are important in this case. Repetition and patience are also of paramount importance here since it is challenging for young Chinese students to roll their tongue to the velum.

CONCLUSION

Chinese students have difficulties with English consonant finals because Chinese language lacks consonant finals, unlike English. It is also seen that Chinese students may also opt for producing /t/ instead of /k/ because of the articulatory easiness and difficulty by which /t/ and /k/ are produced, respectively. Because Chinese consonants are “voiceless”, Chinese students mispronounce English words that have voiced consonants by replacing them with the voiceless counterparts.

Chinese language distinguishes consonants by aspiration, while English language distinguishes them by voicing. This disparity makes the learning of English by Chinese students challenging. This linguistic dissimilarity should be taken into consideration by English teachers while teaching their Chinese students. These differences should also be heeded to by teachers in designing drills and exercises for their students.

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