

## Articulation Disorders Among Speakers of Mandarin Chinese

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**B**ased on U.S. prevalence figures of 3%, as many as 6 million Chinese children may have articulation disorders. A considerable number of Chinese adults also may have articulation problems.

Special education has only recently begun in China. Currently the attention is concentrated mainly on blindness, deafness, physical disabilities, and mental retardation. Few people are engaged in research for the treatment of articulation disorders; consequently, few diagnostic or remediation measures are available.

In the summer of 1990, we set up an articulation disorders therapy clinic in a Beijing hospital to begin developing treatment approaches for the problem of unintelligible speech. Since the opening of the clinic, we have treated over 100 people and marshaled all our resources to help them. Some children had been misdiagnosed as having a short frenum and the frenum had been cut. Their unintelligible speech did not improve. When we were investigating six special schools for the mentally retarded, we were shocked to find a few children of normal intelligence who had mistakenly been diagnosed as mentally retarded because of their severe articulation disorders.

The news of the launching of a therapy program for unintelligible speakers was disseminated by radio, television, newspapers, and journals. We received hundreds of letters from provinces and cities all over China asking for consultations. People came from distant provinces looking for our help. We found that many people have articulation problems of only

one phoneme (mostly the /l/). Ordinarily, they are able to pronounce this phoneme correctly after two or three rounds of therapy (each round takes 20-30 minutes). Of course, additional time is needed to produce this phoneme accurately in spontaneous speech. Children's misarticulations usually involve more phonemes. In one case, a 5-year-old boy mispronounced 11 initial consonants. After 14 rounds of correction, he could speak properly at character level (in Chinese, each character is represented by a single syllable). In another case, a 6-year-old boy who mispronounced 10 initial consonants had all of his pronunciation errors improved at character level in eight rounds of correction. For those who cannot pronounce the phonemes /t/, /t'/, /k/, /k'/, /ts/, and /ts'/ correctly, it typically takes only a few minutes of therapy to improve production at character level.

### The Mandarin Phonologic System

Mandarin is the official common language in China, although numerous dialects are common to the provinces. A brief discussion of the Mandarin Phonologic System may be helpful to clinicians who treat Chinese-speaking children.

#### Vowel System (Finals)

The Mandarin vowel system may be divided into the single vowel and the compound vowel. The single vowel is similar to vowels in English; the compound vowels are similar to diphthongs or triphthongs.

Single vowels include: /a/, /ɤ/, /i/, /u/, /y/, / /, and / /. Compound vowels comprise the following types: (a) vowels having a glide, the loudness of which decreases (/ai/, /ei/, /au/, /əu/, /ər/, and /er/); (b) vowels having a glide, the loudness of which increases (/ia/, /iE/, /ua/, /uɤ/, and /yE/); and (c) vowels, the middle of which is the most prominent in sonority (/iao/, /iəu/, /uai/, and /uei/). In Mandarin, the only consonants that appear at the end of syllables are the two nasal consonants: /n/ and /ŋ/.

Syllables composed of vowels plus nasal final consonant, together with other types of vowels, form a major category called finals. The following are finals with the nasal consonant ending: (a) vowel + nasal consonant (/an/, /ən/, /aŋ/, and /eŋ/), and (b) vowel + vowel + nasal consonant (/ian/, /iən/, /iaŋ/, /iəŋ/, /uan/, /uən/, /uaŋ/, /yən/, /yən/, and /yəŋ/).

Chinese syllables can also be classified according to other criteria, for example, the beginning of finals. Such a category is called *Hu*. In Mandarin, there are four kinds of *Hu*. They include: (a) syllables beginning with /i/, (b) syllables beginning with /u/, (c) syllables beginning with /y/, and (d) all of the other

syllables. Thus, examples of the four *Hu* include: /ian/, /uan/, /yan/, and /an/.

### Consonant System (Initials)

Most Mandarin consonants appear at the beginning of a syllable, with the exception of nasal consonants /n/ and /ŋ/, which may appear at the end of a syllable. According to the Chinese tradition, the consonant appearing at the beginning of a syllable is called initial.

There are 21 initials in Mandarin: /p/, /p'/, /m/, /f/, /t/, /t'/, /n/, /l/, /k/, /k'/, /x/, /tɕ/, /tɕ'/, /c/, /tʂ/, /tʂ'/, /ʂ/, /z/, /ts/, /ts'/, and /s/.

### Tone System

In Mandarin, there are five tones that can differentiate word meaning. In this way, they form a suprasegmental phonological system. The tones are (a) yin level, (b) yang level, (c) rising, (d) departing, and (e) light.

Because of the tonal system, the same phoneme series can mean quite different things. For example, in Chinese the word *ma* may denote *horse*, *mother*, *hemp*, *scold*, or a question, depending on the tone used to speak the word.

### Syllable

In Mandarin, the most simple syllable has only one vowel, for example, /a/, /i/, /ɤ/, and so forth, and the most complex Chinese syllables are initial consonant + compound vowel (/ciau/) or initial consonant + compound vowel + nasal consonant (/kuan/).

### Articulation Treatment in Our Clinic

Our clinic generally treats unintelligible children over 6 years of age. However, we have some data on misarticulations of five children under 5:0 (yrs:mos), two boys and three girls. One girl, suffering from a hidden cleft palate, mispronounced all the phonemes as nasal or nasalized sounds. The number of incorrectly articulated initial consonantal phonemes of the other four children ranged from 11-16. Three of these children mispronounced retroflex vowels /ər/ and /ɛr/ as nonretroflex. The common articulation features of these four children were (a) phonemes incorrectly pronounced involved mainly consonants; (b) aspirated stops and affricates produced as unaspirated (e.g., /p' / mispronounced as [p] and /tɕ' / as [tɕ]); and (c) fricatives produced as stops or affricates.

The data we have on 12 children over 6:0 includes misarticulated phonemes involving 5-11 consonants. The vowels most commonly misarticulated were retroflex /ər/ and /ɛr/ mispronounced as nonretroflex. Seven of 12 children made such errors. The consonants

mispronounced were generally initials with only one case of a mispronounced final: Both final consonants /n/ and /ŋ/ were mispronounced as /m/. From our observation, it has been shown that misarticulated phonemes in the speech of the 12 children were mostly initial consonants.

The phonemes that were most frequently mispronounced were (a) the phoneme /l/ (6 children, or 50%, mispronounced this phoneme); (b) the phonemes /tʂ/, /tʂ' /, /ʂ/, and /z/ (9 children mispronounced this set of phonemes); and (c) the phonemes /ts/, /ts' /, and /s/ (10 children misarticulated these phonemes).

Among these data, an interesting but unexpected phenomenon was found. The frequently occurring articulation disorder—the mispronunciation of aspirated stops and affricates as unaspirated ones—has been found in only one case in our record from the 12 children.

Of the above mentioned eight mispronounced phonemes, the most frequently occurring /l/ was mispronounced because of a manner error, and the rest were mispronounced because of place of articulation errors.

### Summary

The data reported show similarities to the English phonological system, especially with respect to (a) fronting of consonants, (b) phonologic context dependence, (c) non-native language phoneme substitution (e.g., glottal replacement), and (d) omission and addition of phonemes. It appears that a major phonological simplification process common to English speakers, final consonant deletion, or replacement, can only occur in the /n/ or /ŋ/ final consonants of Mandarin, but that initial consonant deletion or replacement may be a more frequent pattern.

We hope that Americans working with English as a Second Language students from Mandarin-speaking homes might join colleagues in China in studying articulatory error patterns in Mandarin.

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