

THE ACQUISITION OF PUTONGHUA PHONOLOGY

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ABSTRACT

This paper reports the phoneme repertoires and phonological error patterns of 600 Chinese-speaking children aged 2;0 to 7;0. The findings support the hypotheses that phonological acquisition is influenced by the ambient language and the mother tongue.

1. INTRODUCTION

There are a lot of factors affecting a child's phonological development, namely biological maturation, cognitive development and exposure to the language, etc. While there were many studies on the phonological development of children learning English, there have been only a few studies on the phonological development of children learning other languages.

Putonghua, being the national language of China, is learned by all children in China. By studying the Chinese children's acquisition of Putonghua phonology, it can shed light onto the theories of phonological acquisition.

Putonghua is a tonal language with a simple syllable structure of (C) V (N). There is a tone attached to each syllable and the change of tone results in the change of lexical meaning. There are 22 consonants, /p, p^h, t, t^h, k, k^h, m, n, ɿ, f, x, s, ts, ts^h, ɿ, ts, ts^h, ɿ, tɕ, tɕ^h, l, r/, 10 vowels / i, ɿ, ɿ, y, u, a, ɿ, o, ɿ, ɿ /, 13 diphthongs / ia, ie, ye, ua, ai, ei, au, ou, uo, ɿe, ya, iu, uo/, five triphthongs / iau, iou, uai, uei, iai/ and four lexical tones, high level, high rising, dipping and high falling tones in Putonghua.

2. METHOD

2.1 Subject

Six hundred Putonghua-speaking children aged between 2;0 to 6;11 were chosen from child-care centers and kindergartens from four cities in China (Beijing, Nanjing, Xian and Chengdu). There were altogether ten age groups with six months apart starting from age group 2;0-2;5; 2;6-2;11; until the age group 6;6-6;11. Equal number of boys and girls were in each age group. All children were normally developing and had no cognitive, language nor hearing deficits.

2.2 Materials

Materials consisted of 80 colored photographs each of 5"x7". Each picture represented a word for naming. The picture list

consisted of two lists and each covered all the Putonghua consonants, vowels and tones. In addition, ten other colored pictures were used to elicit story re-telling.

2.3 Procedure

Each child was asked to name 80 pictures and retell two stories with the aid of ten pictures. The children's speech productions were recorded and analyzed. The data collectors transcribed the children's speech production with narrow transcriptions during the session. Sixty sessions (10% of all the sessions) were re-transcribed by the same rater for intra-rater reliability and by another rater for inter-rater reliability.

3. RESULTS

The results showed that children's acquisition of vowels and tones was completed by the age of three. The acquisition rates of vowel and tone were much faster than that of consonants. The acquisition of consonant was not complete until the age of five years six months.

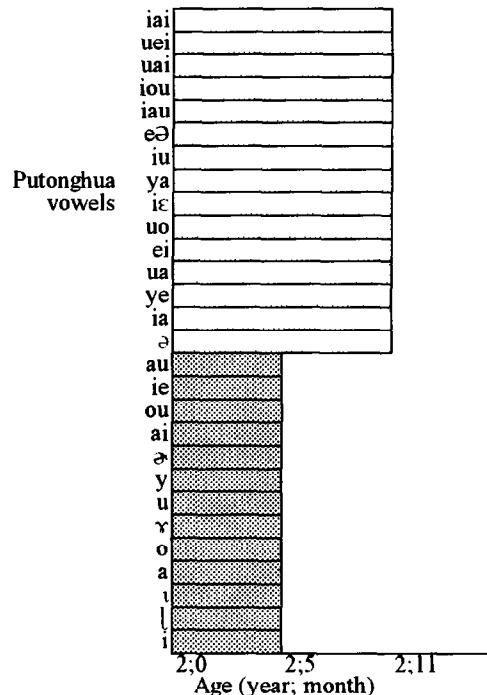


Figure 1: Age of acquisition of Putonghua vowels, diphthongs and triphthongs (90% criterion)

Tones	Age of acquisitions (year; month)
High Level	before 2;0
High Rising	before 2;0
Dipping	before 2;0
High Falling	before 2;0

Table 1: Age of Acquisition of Putonghua Tones

The acquisition order of Putonghua consonants was similar to that reported for Cantonese and English while the rate was slower than that for Cantonese but faster than that for English. Children learning Putonghua showed similar developmental error patterns as those reported for other languages.

Consonants Age	75% criterion	90% criterion
2;0	p, m	p, m
2;6	p ^b , t ^b , t, k ^b , k n, f, h, r, -n, -ŋ	p ^b , k, k ^b , n, f, h, r, -n, -ŋ
3;0	ç, tç ^b , tç	t ^b , ç, t
3;6	l	l, tç ^b , tç
4;0	s, ts ^b , ts	s, ts ^b , ts
4;6	s, tç ^b , ts	
5;0		s, ts ^b , ts

Table 2: Age of emergence Putonghua consonants

Common processes used by Putonghua-speaking children included deaspiration, stopping, fronting, affrication, backing, retroflexion, /l/-deletion, gliding, lateralization, and final glide deletion and final consonant deletion. Some processes used by Putonghua-speaking children were common to those used by children learning other languages but there were specific rules used by Putonghua-speaking children such as affrication, backing, retroflexion, /l/-deletion.

Variations were found in the acquisition rate of the Putonghua fricatives and affricates by Chinese children with different mother tongue. Children from the four cities of China acquired the palatal fricative /ç/ and affricates /tç^b, tç/ at an early age of 2;6. However, the alveolar and retroflex fricatives and affricates were acquired much later and children with different mother tongue exhibited different acquisition rates for those speech sounds. Beijing children acquired /s/ much later than children from the other cities. Beijing and Xian children acquired the retroflex sounds much quicker than the Nanjing and Chengdu children. Different from the other children, Nanjing children acquired /tç^b/ much earlier than the other retroflex sounds /s, ts^b/.

Speech sounds (IPA)	Age (year; month)			
ç	2;6	2;6	2;6	2;6
tç ^b	2;6	2;6	2;6	2;6
tç	2;6	2;6	2;6	2;6
s	4;6	3;6	5;0	3;6
ts ^b	2;6	3;6	5;0	2;6
ts	2;6	5;6	4;6	2;6
ç	4;0	7;0	5;0	7;0
tç ^b	4;0	4;6	4;6	7;0
tç	4;6	7;0	4;6	7;0
Beijing	Nanjing	Xian	Chengdu	

Table 3: Average acquisition age of coronal fricatives and affricates by Putonghua-speaking children with different mother tongue.

4. DISCUSSION

The results showed that the Putonghua-speaking children's order of phoneme acquisition was similar to those reported for Cantonese and English. However, the acquisition rate was slower than that of the Cantonese-speaking children but faster than that of the English-speaking children. This may be due to the different phonological structure of the three languages. There are only three fricatives and two affricates in Cantonese and 75% Cantonese-speaking children completed their acquisition of phoneme acquisition by the age of 3;5. In English there are nine fricatives and two affricates and children need more time to acquire all the phonemes. According to Prather, Hedrick & Kern (1975) 75% English-speaking children completed their phonetic repertoire only by eight years old. For Putonghua, there are three fricatives and six affricates but still 75% Putonghua-speaking children completed the phoneme acquisition at the age of 4;5 which was much earlier than the English-speaking children. Plausible explanation is that the Putonghua fricatives and affricates are all grouped round the coronal area, namely the alveolar, retroflex and palatal place of articulation. To increase intelligibility Putonghua-speaking children need to pronounce the nine coronal sounds distinctly as early as they can.

Second plausible explanation is that the syllable structure of Putonghua is very simple (C)V(N) and children need to pronounce the sound segments correctly to avoid confusion. The Putonghua syllable structure (C)V(N) is similar to that of Cantonese (C)V(C/N) but much simpler than that of English C0-3VC0-4.

Deaspiration is a common process for Putonghua children. This is not surprising as the markedness theory predicted that the unmarked member of a pair was produced before the marked member (Chomsky & Halle, 1968).

Backing is a common process found in the Putonghua-speaking children. Children often substituted the alveolar sounds by the palatal sounds. Comparatively the palatal sounds are easier to

be acquired as the place of articulation is wider and less precise than the alveolar one.

Retroflexion is also a common process found in Putonghua-speaking children as retroflex sounds are common in Putonghua.

The findings suggested that phonological acquisition was affected by the ambient language.

In the detailed analysis of the acquisition of the coronal fricatives and affricates by the Putonghua-speaking children with different mother tongue, differences were found in the rate of acquisition of those sounds. This may be due to the influence of different mother tongue. Retroflex sounds are common in the Beijing and Xian dialects and so children from these two cities acquired the retroflex sounds much earlier than the Nanjing and Chengdu children. In the Nanjing dialect, the sound /tʂʰ/ is present and this may explain why Nanjing children acquire /tʂʰ/ earlier than the other retroflex fricative and affricate. The findings seem to agree with the hypothesis that phonological acquisition is influenced by mother tongue.

5. CONCLUSION

The findings support the hypotheses that phonological acquisition is influenced by mother tongue as well as the ambient language.

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