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A PILOT STUDY OF THE ACHIEVEMENT OF ENGLISH PRONUNCIATION Of Mandarin Speakers: Children vs. Teenagers

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Abstract: There are two purposes of this pilot study. The first one was to find out if there is a "Critical Period" (CP) for acquiring native or native-like pronunciation of L2 through investigating the English pronunciation of ESL children and teenagers whose first language is Mandarin. Although the results of this study tended to support CP hypothesis, there might be some other reasons other than age factor for the phenomenon that ESL children's pronunciation is better than ESL teenagers'. The second purpose is to test two opposite hypotheses about L2 pronunciation: "Contrastive Analysis" vs. Flege's "Speech Learning Model" (SLM). Based on the results, the writer could not favor one over the other. It demonstrated that this pilot study needed to be modified to the extent that these two hypotheses can be tested. There were some suggestions made to improve this pilot study.

I. Introduction

The so-called "Critical Period" for second language (L2) acquisition has been a very controversial issue for almost three decades. Lenneberg (1967) put forth the CPH for first language acquisition. He claimed that there was a biologically determined period of life when language could be acquired more easily and beyond which time (usually around puberty) language is increasingly difficult to acquire. There seemed to be some evidence to support the CPH in language acquisition from "wolf children", the observation of the children with Down's Syndrome, and the studies of abused or deaf persons, such as "wild children" (e.g., Genie) and late-learning deaf students who did not ever master a language (Curtiss 1977).

Later it was extended to L2 acquisition. The results of many studies indicated that the earlier an individual begins to learn a foreign language, the better will be his or her pronunciation of that language. For example, Asher and Garcia (1969) found a negative correlation between age of arrival in the U.S.A. and degree of foreign accent for a group of 71 Cuban immigrants living in the San Francisco, Bay Area in California. Oyama (1976) reported a similar result for a group of 59 Italian-born male immigrants in the U.S.A. Johnson & Newport (1989) also had a similar result for a group of 46 Korean or Chinese speakers who had lived in the

U.S.A. between 3 to 26 years. Pinker (1994:290) even claimed that "most adults never master a foreign language, especially the phonology."

However, in the controlled experiments, most research results leaned toward going against the CPH. The results of many studies show that adults do better than children in L2 acquisition. For example, Neufeld (1978) found that highly motivated university students can achieve a native-like accent after 18 hours of instruction. Ervin-Tripp (1974), Snow & Hoefnagel-Höhle (1978) and Politzer & Weiss (1969) reported that the older children's L2 oral productions are better than the younger ones' in short-term learning. Nevertheless, some studies showed that younger children are better in pronunciation, but older are better in syntax and morphology. Some language researchers, such as Snow (1979) and McLaughlin (1992), thought that children's better L2 pronunciation may not be related to the CP but to other confounding factors, such as the following differences between children and adults:

- (1) L2 input in terms of time, quality, such as longer vs. shorter and reference to concrete objects vs. abstract concepts
- (2) affective factors, such as motivation and anxiety
- (3) social factors, such as identity with the L2 vs. identity with the L1
- (4) incomplete learning, rate of learning vs. extent of learning: for example, adults are short-term learners and children are long-term learners. Adults learn fast at the beginning while children learn thoroughly.

Since the CP is still under debate, this pilot study was designed to examine if there is a CP for Mandarin speakers to acquire a nativelike English accent. Moreover, there are two opposite hypotheses about L2 pronunciation: "Contrastive Analysis" vs. Flege's Speech "Learning Model" (SLM). The "Contrastive Analysis" hypothesis claims and predicts that the L2 phones which are absent or new (i.e., relatively different from any L1 phone) in the L1 will be more difficult for the L2 learners to pronounce than the L2 phones which occur in or are similar to the L2. However, the "Speech Learning Model" claims and predicts that the L2 phones which are "new" eventually will be correctly pronounced by the L2 learners while the L2 phones, which are similar, will not be. Therefore, this study was also designed to test which hypothesis would better predict and explain the Mandarin speakers' English pronunciation.

II. Pilot Study

II. A. Subjects

In this pilot study, there were 10 subjects divided into 3 groups: 4 children for experimental group 1, 4 teenagers for experimental group 2, and 2 native speakers of English for the control group. Below is the information about the subjects.

-Age:

	Mean	Range
Children	8	7 - 9
Teenagers	17	16 - 18
Natives	12.5	10, 15

-Years in the U.S.A. (or years of attending school in the U.S.A.)

	Mean	Range
Children	2	1:6 - 2:7
Teenagers	1:8	1:3 - 3:1

-Years had learned English before arriving in the U.S.A.

Children	0
Teenagers	3:3 (2-5)

-Age teenagers started learning English: 13 (Grade 7)

The children go to Hillcrest Elementary School and the teenagers go to Lawrence High School. Since the subjects live in the same area, they are supposed to have the same socioeconomic status.

II. B. Materials: 1. three sentences; 2. 12 single words; 3. a tape recorder; 4. a short questionnaire; 5. SPSS software

Three sentences and 12 single words were designed to examine the subjects' achievement in English pronunciation at the sentence level and at the word level. In order to test the two hypotheses, CA vs. SLM, five English phonemes /ɛ, ɪ, æ, θ, ð/ were chosen for designing the three sentences and the twelve single words. The English vowel /ɛ, e, æ/ are predicted to be more difficult for Mandarin speakers to pronounce by SLM, but to be easier by CA, since the English /ɛ/ and /e/ phonemes are similar to the Mandarin /ə/ ([ɛ] and [e] are the allophones of /ə/ in Mandarin), and the English /æ/ is similar to the Mandarin /a/ ([æ] is the allophone of /a/ in Mandarin). The English inter-dentals /θ/ and /ð/ are predicted to be easier for Mandarin speakers by SLM but to be more difficult by CA, since Mandarin does not have any inter-dental consonants. The three sentences were:

- (1) I bet this is her bag.
- (2) I think he ate the scrambled eggs.
- (3) Thanks for bringing me the tapes.

The twelve single words covered the above five English phonemes in different positions, such as: word-initial, word-middle, and word-final. They were:

- (1) think (2) bet (3) apple (4) this (5) Cathy (6) egg
- (7) bat (8) another (9) bath (10) ate (11) bake (12) say

A tape recorder was used to record the subjects' English pronunciation. A short questionnaire with a 5-point scale was used to examine the subjects' exposure time to English after school. The questions were:

- (1) I _____ speak Mandarin to my parents at home.
(A. always B. often C. sometimes D. seldom E. never)
- (2) I _____ speak Mandarin to my brother(s) or my sister(s).
(A. always B. often C. sometimes D. seldom E. never)
- (3) I _____ speak English at school.
(A. always B. often C. sometimes D. seldom E. never)
- (4) I watch TV _____ a day.
(A. less than 1 hour B. 1-2 hours C. 3-4 hours D. 5-6 hours
E. more than 6 hours)

Then SPSS software was used to run most of the collected data.

II. C. Procedures

First, I interviewed the subjects from the experimental groups one-on-one. They were asked to read out loud each of the above three sentences and 12 single words. Their oral productions were recorded as they spoke. After that, they were asked to fill out the short questionnaire. As for the subjects in the control group, only the former task was administered to them.

Second, three native English speakers who are Linguistics majors at KU graded the subjects' pronunciation in a random order without knowing any information about the subjects that they were going to grade. The three sentences were graded in terms of stress, intonation, and juncture with a 5-point scale ("5" for native pronunciation, "4" for near native-like with little foreign accent, "3" for near native-like but with some foreign accent, "2" for non-native with moderate foreign accent, and "1" for non-native with strong foreign accent). The 12 individual words were graded with a two-point scale ("1" for correct pronunciation and "0" for incorrect).

Third, the 3 graders' scores were encoded using the SPSS software to test the reliability among the three graders and to find out if there is a statistically significant difference between the children and the teenagers in their English pronunciation.

III. Results and Discussion

The results show that the reliability among the three graders is pretty high (1.0 for the sentences, 0.84 for the words). For example, three of them gave the two native speakers exactly the same scores: "5" for each sentence and "1" for each single word.

As for the pronunciation, the results are shown in the following table.

t-test for Equality of Means Two-tail, Significance level = 0.01

	Children	Teenagers	t-value	Significance
Sent. Mean	3.2	1.3	7.74 > 3.707	Yes
Word Mean	0.85	0.72	1.63 < 3.707	No

- "5" is regarded as a native speaker's pronunciation, and "1" is non-native pronunciation with a strong foreign accent at the sentence level.

- "1" is regarded as correct pronunciation and "0" as incorrect at the word level.

From the table above, we know that the children's English pronunciation is much better than the teenagers' at the sentence level, but only slightly better than the teenagers' at the word level. There is a statistically significant difference between the children's and the teenagers' pronunciations at the sentence level but not a statistical significance at the word level. In addition, the results also show that both the children and the teenagers have better English pronunciation at the word level than at the sentence level. This indicates that a native or native-like pronunciation at the sentence level is more difficult for Mandarin speakers to achieve than at the word level. There may be two reasons for this interesting phenomenon.

First, the words in the sentences tend to be less pronounced and to be paid less attention to than they are in isolation. This is because when people say words in isolation, they can easily give them full attention and make sure every phoneme is pronounced. However, when they say words at the sentence level, there are so many phonological and phonetic features, such as juncture, sentence stress, and intonation that need their attention. Therefore, they are likely to drop some phonemes or mispronounce them.

Second, some features at the sentence level in English are quite different from those in Mandarin. Thus, it is more difficult for Mandarin speakers to achieve native pronunciation at the sentence level. For example, the juncture in English never happens in Mandarin since English is a polysyllabic language while Mandarin is a monosyllabic language. Mandarin has each syllable (i.e., each word) pronounced distinctly from the other. There is no juncture between two syllables (two words). Thus, when Mandarin speakers speak English, they tend to make syllables distinct from one another and almost give every syllable a stress, which violates one of the English phonological rules. For example when they say "arm and leg" they usually say ['arm 'ænd 'leg], instead of ['arm ən 'leg] or ['armə 'leg]. This phenomenon suggests that it is better and more revealing to use sentences to evaluate the L2 learners' pronunciation than the words in isolation.

As for my interpretation of the result, the fact that the children's English pronunciation is much better than the teenagers' is due to "**habit formation**" and "**L1 interference**." The teenagers are more used to the Mandarin pronunciation than the children since they have been exposed to Mandarin longer than the children are. Their articulators, such as tongues and lips, are more used to certain gestures for the Mandarin pronunciation than the children's. Therefore, it will take the teenagers more time to get used to another gesture for English pronunciation. However, after several years of training or rote practice, the teenagers' achievement may be as good as the children's. Thus, my interpretation tends to reject the so-called "Critical Period Hypothesis" for the aspect of pronunciation.

The results may attract some people's attention to EFL (English as a foreign language) education in Taiwan and China since the teenagers had 2-5 years of English education before they came to the U.S.A. while the children had none. This implies that the teenagers' early exposure to English from non-native teachers in Taiwan or China may have had an effect on their English pronunciation while the children, in contrast, had native speaking teachers from the start. It also gives some warnings to the EFL teachers in Taiwan and China that they need to improve their EFL programs, their own English pronunciation, or their teaching skills and methods.

However, others may think it does not make much difference for English pronunciation whether or not the subjects had learned English and how long they had studied English before they came to the U.S.A. What is more important is the length of their immersion time in English and their ages of arriving in the U.S.A. They consider that "the longer and the younger, the better," since there may be less interference from their first language in their English pronunciation.

Moreover, the data in the following table show that there is no significant difference between the vowels /ɛ, e, æ/ and the consonants /θ, ð/ in terms of level of difficulty. Therefore, this study can neither accept nor reject either of the hypotheses: CA vs. SLM. This may be due to the fact that the time of exposure to the L2 is not long enough for the Mandarin speakers to establish their own interlanguages. Thus, this result suggests that the study should be redone with subjects who have been in the U.S.A. longer than 2 years to see if there is a statistically significant difference between these two types of sounds: similar vs. new.

Level of difficulty for each phoneme

Phone	/θ/	/ð/	/e/	/ɛ/	/æ/
L.D	0.18	0.23	0.25	0.18	0.21

- "L.D." means, "Level of Difficulty".

- "0" means no difficulty at all and every subject gets the right pronunciation.

- "1" means the level of difficulty is very high and nobody gets the right pronunciation.

Now let's investigate if the level of difficulty of each phoneme varies with its distribution. The data in the following table indicate that only the distribution of the /θ/ phoneme is significantly different and the distribution of the rest of the phonemes does not make much difference in terms of level of difficulty. The /θ/ sound in the word-initial position ("think") is more difficult than in the word-final position ("bath"). However, judging from the previous table, the /θ/ sound in general is not more difficult than the other four sounds.

Level of difficulty for each phoneme in different positions.

Phonc	/θ/- initial	/θ/-mid.	/θ/- final	/ð/- initial	/ð/-mid.	/ɛ/-initial	/ɛ/-final
L. D.	0.3	0.21	0.05	0.3	0.17	0.21	0.3
Phonc	/e/- initial	/e/-mid.	/e/-final	/æ/initial	/æ/- mid.		
L. D.	0.13	0.13	0.3	0.25	0.17		

- "L.D." means "Level of Difficulty".

- "0" means no difficulty at all and every subject gets the right pronunciation.

- "1" means the level of difficulty is very high and nobody gets the right pronunciation.

Since this is just a pilot study, only one word for each distribution was designed. A future study may need to design more words with the same sound in different positions to test if the level of difficulty of a sound varies with its distribution.

Moreover, some language researchers consider the time of exposure to the second language (L2) after school an important factor, which may affect the L2 learners' pronunciation. Therefore, this factor was also examined in this study. The frequency of using English at home and the amount of time watching TV were considered in determining the time of exposure to English. The data in the following tables show that the children more frequently use English after school than the teenagers, while the teenagers watch more TV than the children. Thus, it may be inferred that there is no significance between children and the teenagers in the time of exposure to English after school.

Frequency of English used at home

	Always	Often	Sometimes	Seldom	Never
Children			4		
Teenagers			1	1	2

Average hours of watching TV every day

	< 1	1- 2	3-4	4-6	> 6
Children	2		2		
Teenagers		2	1	1	

IV. Conclusion

From this pilot study, I learned first that Mandarin speakers need more than two years of immersion time in English to acquire a native-like English accent. Second, the children do have better English pronunciation than the teenagers. There might be three reasons for this phenomenon. One might be the reason of "habit formation". The teenagers' articulators are more used to the gestures for the Mandarin pronunciation since they are exposed to Mandarin longer. Therefore, it should take the teenagers more time to get used to the English pronunciation. Another reason might be that the teenagers' early exposure to English pronunciation from non-native teachers in Taiwan or China have had a negative effect on the teenagers' pronunciation. The other reason is probably that the teenagers get more interference from their L1 also due to the longer exposure to Mandarin. Therefore, the interpretation of the results tends to reject the CPH. However, I do believe it is better to start learning a second or foreign language in an immersion environment as young as possible since the articulators are more flexible and there is less interference from the L1. Nevertheless, I think age makes little difference when the L2 learners start learning the L2 in a non-immersion environment and are taught by non-native instructors, who are not good language models. That is, the quality and the amount of immersion time in the L2 are more important than the age.

As for the issue of "Contrastive Analysis" hypothesis vs. "Speech Learning Model", they might be tested by modifying this study's subjects and materials. For example, the subjects should have been in the U.S.A. more than four years which is long enough for them to master English pronunciation. In addition, more words with different distribution of the same sound should be designed to test these two hypotheses.

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