

**Relationship between the Phonetic Aspect  
of Second Language Acquisition and Age:  
Testing on the Critical Period Hypothesis in a Selected Function of Language**

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**Abstract**

The Critical Period Hypothesis, that the learning of language is better achieved if done before a certain age (critical period), is a well-known hypothesis. A number of studies have supported this hypothesis in the acquisition of the first language; however, it does not always stand true in the acquisition of a second language due to the complexity of language learning: managing vocabulary, grammar and usage calls for more sophisticated brain function than what is needed to simply imitate a sound. However, if the language skill is limited to the phonetic aspect only, the hypothesis may still stand true. This is a study on the observation of G1-G6 participants in a 2014 Kids' English Class in Ibigawa to test the Critical Period Hypothesis. Two functions were tested: the distinguishing of sounds unique to English and the pronouncing of the sound unique to English. The result is hoped to show which aspect of language skill should be emphasized at what age group, especially in the earlier stage (the elementary school level).

**Key words:** second language acquisition, critical period hypothesis, English education, ESL

**I. Introduction**

Human life is characterized by coming to being at birth, by vibrancy at youth, by a slow decline at maturity, and a gradual decay at advancing age. It is simply inescapable that human life has a beginning, a peak, and an end. This life cycle is actually beneficial to the species as it continually renews itself with compounding collections of advancements as people interact with each other, mostly facilitated by the verbal medium. When it comes to language, children simply acquire it as they grow – a sort of automatic language learning that is supposedly attached with an optimum period. This is a factor that has spurred the debate on what causes language acquisition in both first- and second-language acquisition as communication plays a central role in the social animal that is mankind. The twist and schism in opinion was generated when people like Lenneberg (1967) forwarded the Critical Period Hypothesis (CPH).

According to Rod Ellis in his work, *Understanding Second Language Acquisition*, in 1959, Penfield and Roberts first posited an argument that the optimum age for language acquisition falls in the first ten years of life; they forwarded that after such age, the plasticity gradually disappear due to a lateralization to the left hemisphere of the brain resulting in a decreased capacity in terms of understanding and production of language (Ellis,

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1995, p. 107) . Thus, instead of a fully functional interconnected brain, older language learners can only rely on the left hemisphere for proficiency in verbal communication. This neurological change is attributed to the natural progression that the human body and brain goes through as it passes through the stages of the life cycle. The critical period hypothesis got a boost from the 1967 work of Eric Lenneberg where he observed that children with right hemisphere brain injuries had greater language problems than adults in similar cases; in reverse, left hemisphere damage did not pose language problems with children, but had adverse circumstances among adult cases (Ellis, 1995, p. 107) . This pointed to a sharp difference in the neurological language factors between children and adults that gave support to the theory.

Ellis claims, however, that Lenneberg's evidence is inadequate and does not substantiate the claim that language acquisition is effortless only before puberty. Ellis posits that the hypothesis is only partially correct as it only applies to pronunciation and even then, it only serves the success rate and not the acquisition equation. Thus, the assumption will have to be remodeled so that it can explain why plasticity only affects pronunciation and not the other aspects of language (Ellis, 1995, p. 107) . Ellis suggests that Lateralization happens gradually through an extended time frame and the critical period is not a single episode, which is the reason why different facets of language get highlighted at different stages in the human growth process. He then concludes his critique by claiming that the evidence equating cerebral dominance and the age factor as vague with a closure that still proves to be elusive. This debate on the Critical Period Hypothesis has polarized scholars and both sides have supporting evidences. The acceptance or rebuff of this assumption needs a breakthrough supposition that has the power to generate a decision.

## **II . Definition of Critical Period Hypothesis**

In terms of normal language development, the first sound produced by humans is the sharp cry of the newborn. Crying will be the norm until the infant starts to combine vowels and consonants into babble sounds like "baba" and progresses to other babbling sounds like "mama" or "dada." From then on, one word leads to two words, then to three words, and so on. The child gets wind of the spoken language and tries to gain some mastery of a few words so to forward needs and requests. This is the commonly known path towards normal language acquisition.

Rosansky (1975, p. 94) posits that the fundamentals for language acquisition to become automatic are to have less flexibility in thinking, to see only similarities, and to be self-centered – the characteristics of a young child. Children then continue to learn from people around them and make their own efforts to understand and be understood; this process continues until a time where there is rapid language acquisition that then subsides with age. Simply stated, the Critical Period Hypothesis asserts that there is a period where language acquisition flows naturally and verbal communication is effortlessly learned. It has been found that control and manipulation of muscles that govern the articulators of

speech like the mouth, tongue, and vocal chords, start to diminish in about 10 through 12 years of age; a fact that swings the support toward those who advocate for the Critical Period Hypothesis (Steinberg, Nagata, & Aline, 2001, p. 142) . In the cycle of birth, youth, and old age, there is a critical period for the learning of language.

### **III . First Language Acquisition**

It is a logical conclusion that as children grow, so too does their collection of experiences, and that new sets of vocabularies go with it. In due time, the cognitive capacity will be at a level that the child is susceptible to learn in a rapid manner – the supposed critical period of language acquisition. The 1967 work of Lenneberg that pointed to a fading of neural plasticity that impacts the learning of verbal communication has cemented the Critical Period Hypothesis into the annals of debate among scholars. This substantiated the claim for a critical period (Grimshaw, Adelstein, Bryden, & MacKinnon, 1998, p. 253) . The mechanism was simple – upon neural maturity and with the lateralization of the language capacity, limitations now exist in matters of language learning.

In the case of children in special circumstances, some of them do not achieve full proficiency because they were not exposed to some forms of language such as speech, signs, writing, or even touch – prerequisites for language learning which are usually experienced early in life (Steinberg, Nagata, & Aline, 2001, p. 140) . In the celebrated cases of Isabelle and Helen Keller as compared to other famous cases such as Victor, Genie, and Chelsea, it can be claimed that there is a critical period for learning first language as both Isabelle and Helen, who were exposed early to language, at ages 6 and 7, did much better than the other three who experienced initial exposure to language at twice the ages of the two girls (2001, p. 143) . However, available data still do not warrant conclusions and more has to be done on this aspect.

Additionally, Gina M. Grimshaw, Ana Adelstein, M. Philip Bryden, and G. E. MacKinnon, in their study of E.M., a 15-year-old who had been deaf since childhood with that lifespan spent in a rural area in Mexico. What was good for E.M. was that he had an initial exposure to some language – homesign – a factor that would aid him in his quest for the medium of verbal communication (Grimshaw, Adelstein, Bryden, & MacKinnon, 1998, p. 251) . E.M. was able to attain significant achievement, given his circumstances, but the best thing working for him was that he could easily delve into his homesign during times of stressful coping with verbal communication. In E.M.'s case, he would progress more on the manual aspect of communicating, a triumph of the Critical Period Hypothesis, as homesign bore the cognitive and neural structures where his own language gets its foundation (1998, p. 253) . E.M. had created his own language and this made him functional.

### **IV . Second Language Acquisition**

As equated to Critical Period Hypothesis, Second Language Acquisition (SLA)

has its own dynamics as these learners have an initial exposure to language learning and the previous experience bears significance in their success in gaining a second language. However, this maturational factor has researchers divided as to how CPH affects the learning of a second language. In his discourse titled, "Unlikely Bedfellows: The Critical Period Hypothesis and its Effects on Second Language Acquisition," Makoto Tokudome asserts the idea that language learning is discontinued due to exceeding a critical period and that native-like proficiency cannot be achieved by second language learners is simply false (2010, p. 19). This presupposition is supported by an argument by Bongaerts which states that two conditions must be met. First that the slope in the decline of second language proficiency must show a defined discontinuity centered around the critical period and second that no second language learner after the critical period must be able to attain proficiency (Bongaerts (2005) cited in Tokudome, p. 22). As data from previous researches point to the contrary, the claim of a Critical Period Hypothesis is thus considered weak.

Rod Ellis in the 2008 work, *The Study of Second Language Acquisition*, stresses the importance of motivation in the success of L2 acquisition and divides this factor to more details in that motivation can be causative, resultative, intrinsic, or extrinsic (2008, p. 36). Motivation is a universal factor in human endeavors and it surely does exert tremendous impact in SLA. Another individual learner factor is cognitive style, although with uncertain outcome, it refers to the way people perceive, organize, conceptualize, and recall any given information. The field of psychology has defined various cognitive style dimensions, but the most attention being provided for in SLA pertains to field dependence/independence. Field dependence has a holistic approach while field independence is analytic and that the latter is said to lead to better learning in the classroom setting (Ellis, 2005, p. 37). In matters of motivation and cognitive style, adult learners do have an advantage as they take self-advancement as a prime motive of continuing learning. And, with the fact that adults are able to achieve as much as children, or better, in terms of SLA, then, the Critical Period Hypothesis is thus unsustainable (Larsen-Freeman & Long, 1991, p. 201). For their part in disproving the Critical Period Hypothesis, Ellen Bialystok and Kenji Hakuta, cited cognitive and linguistic factors that are encompassed in the learning process so to refute specific claims of the other camp (Bialystok & Hakuta, 1999, p. 178). The argument continues, but what matters most is that as researchers continue to investigate on this subject matter, there is a better chance that significant elucidations can be achieved.

## **V . Hypothesis**

The previous studies have revealed that the processes of the first language acquisition and the second language acquisition are different and that the same generalization cannot be applied to both processes in the same manner. While the acquisition of the first language takes place holistically, the second language learning is divided into many different elements such as listening, speaking, grammar, vocabulary,

motivation and other cognitive factors. When the Critical Period Hypothesis is taken into consideration, it is possible to explain much of the first language acquisition process. However, the process of the second language acquisition is much more complicated and not all the elements of language acquisition can be explained by CPH.

Therefore, it is more feasible to isolate each element in the study of second language acquisition when attempts are made to relate to age factors. This way, we should be able to determine which language element should be emphasized at what age group in teaching a second language. Especially when English education is introduced at an earlier stage of education, this type of study will be able to provide some hints to the best composition of its curriculum and classroom activities.

Almost every ethnic group has its own music, and most of us grow up listening to such music consciously or unconsciously. As we age, we feel “nostalgic” when we hear the music we have heard at certain times of our lives. This nostalgia never occurs when we hear the music we have been exposed to at much later stages in our lives. It can be reasonably assumed that the music perceived by the right hemisphere of the brain before the lateralization of the audio function to the left hemisphere is closely associated with the “nostalgic” feeling. At an early age, melodies and chords are perceived holistically as one sound and accepted as they are no matter what the musicological nature might be. However, after the certain time of life, melodies and chords cannot be perceived as one sound. We have to look at each note to see what a given chord is, and it is easier to see the notes to learn a new piece of music than just listening to the sound. At such a stage, strange tunes are perceived as “exotic.”

The similar process is most likely taking place in the acquisition of the phonetic aspect of language. Each language has its own set of phonemes and it is acquired holistically by a first language learner. This must take place before the brain lateralization. After the acquisition of the first set of phonemes, any other phoneme sounds strange and often it is difficult to distinguish or reproduce. In the Japanese set of phonemes, phonemes such [l], [r], [θ], [v], or [s] in a specific case do not exist. Therefore, when speakers of Japanese as a first language hear these sounds for the first time in the learning of English, they have a hard time identifying these sounds and tend to substitute with sounds which are most familiar to them. The confusion of sounds between [l] and [r], [θ] and [s], and [s] and [ʃ] is a typical example of such a case.

If a set of phonemes in the first language is acquired holistically because the process takes place before the Critical Period, wouldn't there be a chance for the second language phonemes to be acquired in the same manner if it took place before the Critical Period? Researchers such as Seliger (1978, p.16), Walsh and Diller (1981, p. 18), and Scoval (1988, p. 101) observed that the pronunciation of a second language acquired before the Critical Period is comparable with that of a native speaker. However, the pronunciation of a second language acquired after the Critical Period never becomes native-like. It always retains the accent of the first language no matter how fluently or

intelligently it is spoken. This phenomenon is known as Conrad-Kissinger Syndrome.

Based on these past findings, it is possible to form the following hypothesis:

**As far as the acquisition of second language phonemes is concerned, the degree of success is higher if it takes place at lower ages before the Critical Period.**

## VI . Methods

### A.Purpose of the Study

The purpose of this study is to determine whether there is correlation between age and acquisition of second language phonemes when age is limited to before reaching the Critical Period. For this purpose, listening and speaking skills are isolated from other skills in the evaluation. Also, the period of study is limited to a relatively short period since the rate of success becomes higher at any age group if longer time is allowed.

### B.Methods

A tuition-free Kids' English Class was established during the month of August 2014 as a community service in the Ibigawa area of Gifu Prefecture. The classes were held on Mondays, Wednesdays, and Fridays every week except during the Obon holiday period. The total number of instructional days was ten days. Subjects were interested local children ranging from G1 to G6 (ages 6 to 12) registered on a first-come-first-served basis. There were 48 children, and the number of each age group varied from four to nine (The numbers of each grade were G1=9, G2=8, G3=10, G4=11, G5=6, G6=4) . Since Japanese schoolyears begin in April, each grade has two age groups; e.g., Grade 1 includes 6-year- and 7-year-old students.

There were three periods of 50-minute-classes in the morning. The group was divided into three subgroups: Lower Grades G1-G2, Middle Grades G3-G4, and Higher Grades G5-G6. Three lessons of different natures were held in rotation as shown on **Table 1**.

Table1:Kids' English class schedule

	Lower Grades (G1-G2) (17 children)	Middle Grades (G3-G4) (21 children)	Higher Grades (G5-G6) (10 children)
Period 1 (9:00-9:50)	English Listening & Speaking	Play with English	Let' s do summer homework
Period 2 (10:00-10:50)	Let' s do summer homework	English Listening & Speaking	Play with English
Period 3 (11:00-11:50)	Play with English	Let' s do summer homework	English Listening & Speaking

The English Listening and Speaking classes were taught by a native English speaker. The English Play and Homework classes were supervised by university student volunteers. The same contents of lessons were given in Listening and Speaking classes regardless of the age group. All the participants had had some kind of exposure to English mostly in other child-level English classes. This report is based on the data obtained in the "English Listening and Speaking" sessions only.

### C. Contents of the Study

Part of the class was devoted to distinguishing certain English sounds which are not included in the Japanese set of phonemes or not clearly distinguished in the Japanese language. The following sounds were presented to the children by showing pictures on the screen:

1. Distinction between diphthong and long vowel: [ou] and [ɔ:]  
*bowl/ball, boat/bought, coat/caught, mole/mall*
2. Distinction between sounds which sound similar to other Japanese sound (1) :[æ] and [ʌ]  
both of which sound like “a (ア)” to Japanese ears  
*hat/hut, bank/bunk, match/much, fan/fun, cat/cut, cap/cup, bass/bus*
3. Distinction between sounds which sound similar to other Japanese sound (2) : [ɑ:] and [ə:]  
both of which sound like “a (アー)” to Japanese ears  
*heart/hurt, carve/curve, far/fur, fast/first, farm/ firm, bath/birth*
4. L and R at the end of a word  
*bell/bear, well/wear, bill/beer/ pull/poor*
5. L and R at the beginning of a word  
*lock/rock, lake/rake, lamb/ram, long/wrong, light/right, low/row*
6. L and R in the middle of a word  
*play/pray, bloom/broom, fly/fry, clown/crown, climb/crime, cloud/crowd, glass/grass, blue/brew*
7. [b] and [v]  
*base/vase, best/vest, bat/but, bee/v (vee) , boat/vote*
8. [si] and [ʃi]  
*sea/she, seat/sheet, sip/ship, single/shingle, seep/sheep*
9. English songs  
“Row, row, row, your boat,” “Happy birthday to you,” and “ABC song.”

### D. Evaluation

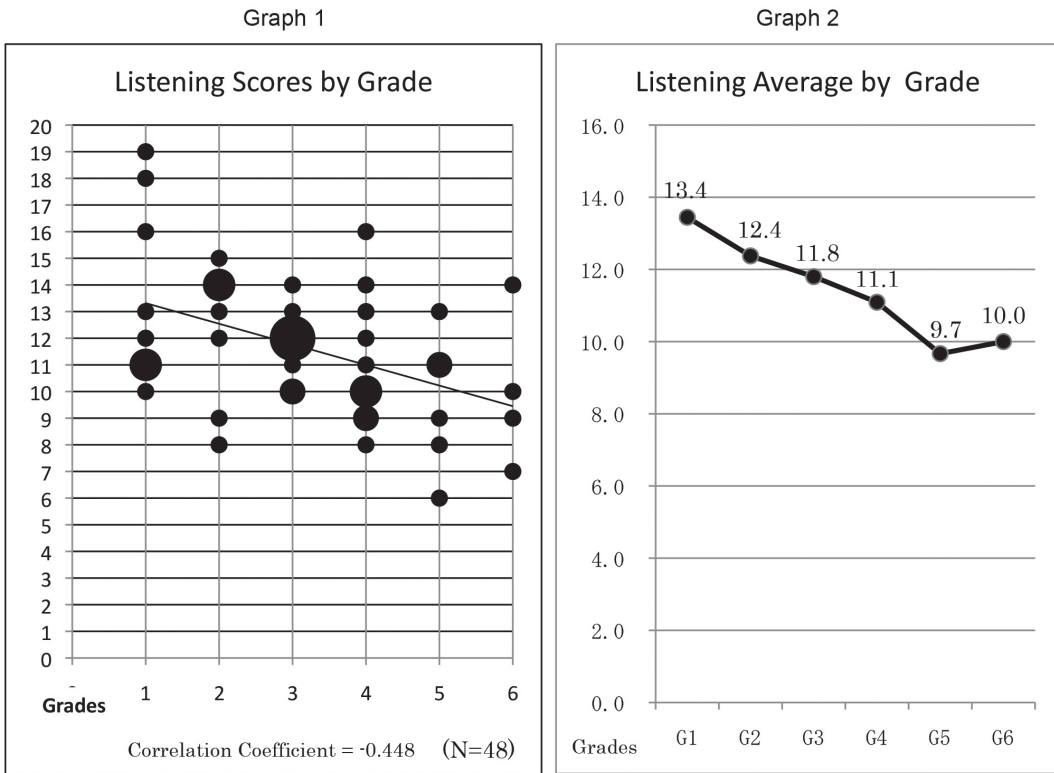
No writing was used in any class. Only pictures or photos were shown on a television screen or paper. First, single pictures were shown with correct pronunciation, which children were supposed to imitate. Then two pictures were shown at the same time and children were supposed to guess which picture was pronounced by the teacher. In each session, the accuracy of each child's pronunciation was evaluated on a 1-5 scale and a small quiz was given with ten sets of pictures in which children had to circle the picture pronounced by the teacher. The last ten minutes were devoted to simple dialogues containing the sound of the day. In the final session, children were given a paper test consisting of 20 sets of pictures in which they had to circle one picture in each set pronounced by the teacher.



**VII . Results**

**A.Relationship between Age and Listening Skill**

**Graph 1** shows the distribution and **Graph 2** shows the average scores of the final day’s test. Since the number of each age group is not large enough, the distribution is rather scattered; however, the graph indicates the tendency that the scores decline as the age progresses. The coefficient of correlation was -0.448 and supports the original hypothesis.



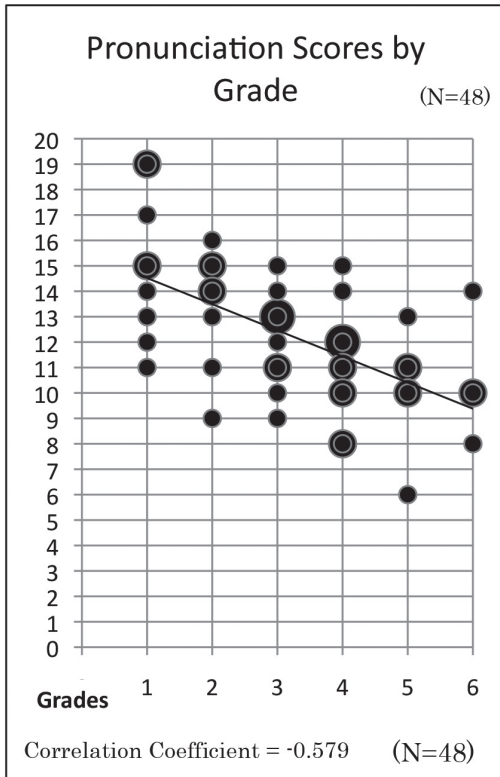
**B.Relationship between Age and Pronouncing Skill**

Similar results were obtained in the study of the relationship between age and pronunciation skill (**Graph 3 and Graph 4**). As the age progresses, the scores of pronunciation skill tend to drop. The coefficient of correlation was -0.579 and supports the original hypothesis.

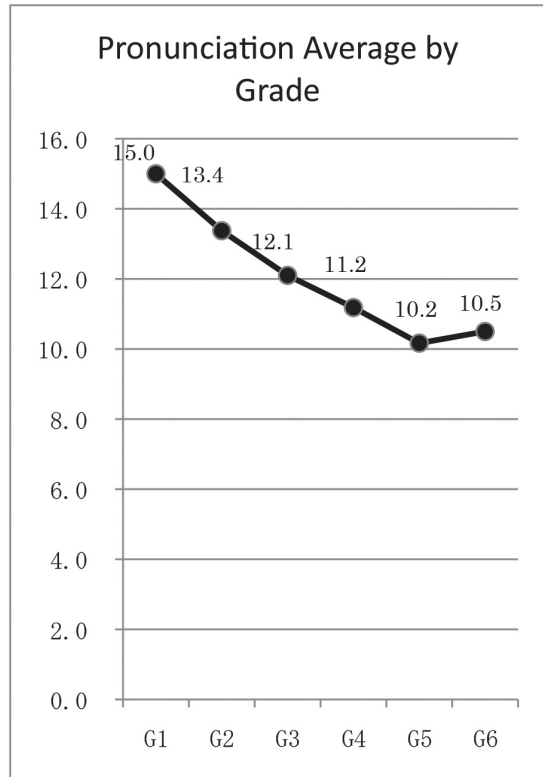
One thing to be noted here is that the average scores are higher in pronunciation skill than listening skill. It is ordinarily understood that we have to be able to hear and distinguish a sound before we can pronounce it, thus the listening scores should be higher than the pronouncing score. However, the result was the opposite. This may be due to the nature of the tests given. In evaluating pronunciation skills, a word was pronounced by the teacher first, and all the child had to do was to imitate the sound. Here, the process is very slow and the child did not have to pay attention to anything other than pronunciation.

However, the listening test was instantaneous. Two pictures were presented at the same time, and the child had to choose one as soon as the teacher pronounced a word. The act requires the process of recalling from the memory and making connections between vocabulary and pronunciation. While imitating a sound requires a simple motor skill (right hemisphere of the brain), listening and judging requires some analytical skills controlled by the left hemisphere. Thus, listening tended to be slightly more difficult than pronouncing.

Graph 3



Graph 4



**C. Relationship between Age and Skill to Distinguish Single Phonemes**

The achievement of a month long (net 10 days) practice in listening skill to distinguish single phonemes can be seen in the test given on the final day. The result shows the distinction between [ɑ:] and [æ:] was the easiest and the distinction between [ou] and [ɔ:] was the most difficult. The ranking and the percentages of correct responses are shown in **Table 2** below.

Table 2: Correct Responses in Distinguishing Single Phonemes

Easiness Ranking	1	2	3	4	5	6
Phonemes	[ɑ:] and [ə:]	[si] and [ʃi]	[æ] and [ʌ]	[l] and [r]	[b] and [v]	[ou] and [ɔ:]
Overall Correct %	75%	69%	68%	59%	39%	23%
Lower Grades	84%	73%	70%	64%	40%	25%
Middle Grades	71%	68%	64%	56%	46%	21%
Higher Grades	67%	63%	69%	59%	26%	22%

The distinction between [ɑ:] and [ə:] turned out to be the easiest task although the sound [ə:] does not exist in Japanese phonemes. The distinctions between [curve] and [carve] (73% correct) and [heart] and [hurt] (77% correct) were included in the final test. Especially in the lower grades class, scores were as high as 81% and 88% respectively. In diphthongs and long vowels, the time being pronounced is much longer than in short vowels or consonants and the listener has more time to determine the nature of the sound than other sounds.

The distinctions between [si] and [ʃi] and [æ] and [ʌ] were also relatively easy tasks. However, not all the pairs presented were clearly distinguished. The percentages of correct responses were [seat] and [sheet] (55%), [ship] and [sip] (89%), [single] and [shingle] (61%); and [bank] and [bunk] (43%), [hat] and [hut] (84%), [match] and [much] (80%), and [fan] and [fun] (64%).

The sounds that were most difficult to distinguish were [ou] and [ɔ:]. The Japanese word “father (お父さん)” is spelled “おとうさん [o-tou-san],” but it is actually pronounced “おとーさん [o-tɔ:-san].” The similar change occurs elsewhere in the Japanese language. Therefore, to the speaker of Japanese as a first language, [ou] and [ɔ:] might be perceived as the same sound. This is a typical case in which the first language is disturbing the acquisition of a second language. In the final test, the distinction between [boat] and [bought] scored the lowest (11%). In Japanese, a boat is “ボート [bɔ:t],” and when the teacher says “bought[bɔ:t],” the children would immediately associate the sound [bɔ:t] to a boat.

The distinctions of the sounds between [b] and [v] was also not an easy task. These are consonants and pronounced in a tiny fraction of a second. Therefore, even if they knew the difference, the children would often fail to catch the sound. In the test, the correct responses were [best] and [vest] (57%), and [bat] and [vat] (18%).

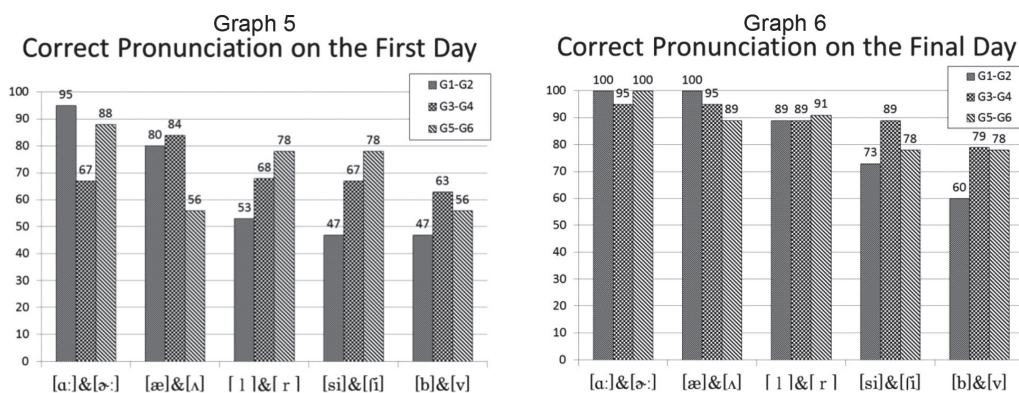
It was originally assumed that [l] and [r] would be the most difficult sound to distinguish since neither sound exists in the Japanese set of phonemes. In everyday Japanese, since both [la] and [ra] are substituted with Japanese “ラ [dla],” ordinary Japanese ears cannot distinguish [la] from [ra]. However, surprisingly, the children scored much higher than what had been expected. The correct responses were [bear] and [bell] (70%), [bloom] and [broom]

(67%), [fry] and [fly] (57%), [cloud] and [crowd] (43%), [clown] and [crown] (57%), [play] and [pray] (66%), and [climb] and [crime] (57%).

Overall, the lower grade children scored higher than the higher grade children in relatively easily recognizable sounds. However, there was no correlation between age and score in more difficult sounds. On the whole, younger children had higher scores than older children, and the result of the test supports the original hypothesis.

#### D. Relationship between Age and Skill to Pronounce Single Phonemes

In most cases, sounds that are easier to distinguish are easier to pronounce. However, the opposite may not be always true. The typical example is the case of [ou] and [ɔ:]. Since the both sounds exist in the Japanese set of phonemes, it easy for anyone to pronounce (The correct scores of the pronunciation of the sounds [ou] and [ɔ:] were 100% in both cases). But distinguishing the two by listening is not always easy since the both sound the same to Japanese ears. Even if one can distinguish the sounds clearly, one sometimes cannot remember if “boat” is [bout] or [bɔ: t]. This is more of a lexical problem than a phonetic problem. [ɑ:] and [ɔ:] turned out to be relatively easy sounds to pronounce, while [b] and [v] were the most difficult sounds to distinguish and pronounce. **Graph 5** and **Graph 6** indicate the scores of pronunciations tests before the program and after the program indicating the improvement.



The graphs show a tremendous improvement in the pronunciation of all the phonemes. The rate of improvement was larger in the middle to lower age groups. It means that the lower age groups were more perceptive to the audio input and the imitation of sounds. The results tell us that it is extremely important to provide the young learners with the correct pronunciation

Looking at each set of phonemes, [ɑ:] and [ɔ:] were easy to both distinguish and pronounce. Although the phoneme [ɔ:] does not exist in Japanese, as long as the correct pronunciation was given, there was no problem in reproducing the sound. All the children were singing “Happy Birthday to you!” with the correct pronunciation after only the second or third round.

Although neither [l] nor [r] exist in Japanese, a surprisingly large proportion of children (90%) became able to pronounce both sounds. As long as correct pronunciation is provided before the Critical Period, it is not impossible for any Japanese to acquire these sounds. As far as the phonemes not included in Japanese such as [l], [r], [v], [θ] are concerned, the author's personal experience shows that it is best to introduce them to children when they are still acquiring the phonemes of the first language, Japanese, so that these English phonemes are included in the set of phonemes learned as a first language. This way, these sounds are perceived as independent sounds which do not have to be substituted by similar Japanese sounds.

Another surprising observation was that a considerable number of children were unable to distinguish and pronounce [si] and [ʃi] and [b] and [v]. Children who had problems with [si] and [ʃi] were able to pronounce only one of them. This most likely was due to the irregularity of the Japanese alphabet system. The portion of the Japanese alphabet system concerning [si] and [ʃi] can be transcribed in the English alphabet as shown in **Table 3**.

Table 3: "Sa" and "Sha" Columns of the Japanese Alphabet

"Sa" column	さ sa	し shi	す su	せ se	そ so
"Sha" column	しゃ sha	—	しゅ shu	—	しょ sho

The second character in the "sa" column (in this case "row") "し" is pronounced "shi" instead of "si," while the second frame in the "sha" column is empty. Thus, in the process of learning Japanese, some children never realize there is such a sound "shi" in Japanese and start pronouncing "し" in the most logical manner "si." In Japanese elementary schools, the difference is never pointed out and both "shi" and "si" are accepted as the pronunciation of "し." Furthermore, since they do not realize "shi" belongs to the "sha" column, they can easily pronounce "sha[ʃa]" "shu[ʃu]" and "sho[ʃo]," but they cannot pronounce "shi[ʃi]." This is a very obvious case in which the first language is hindering the acquisition of a second language.

In the pronunciation of [v], the younger children had a more difficult time in pronouncing it. In producing the sound [v], since a more complicated motor skill is involved, it seemed easier for the older children to reproduce the sound. The similar tendency was observed in the reproduction of [ʃi]. From this observation, the correlation between age and the skill to pronounce seems far more complicated and cannot be generalized. Thus, the Critical Period Hypothesis is only partially supported in this as far as the reproduction of unfamiliar phonemes is concerned.

## VIII . Conclusion

This has been a study to test the hypothesis: The degree of success in the acquisition of a second language is higher at an earlier age as far as the phonetic aspect of the language

skill is concerned. The first language of the subjects in this study was Japanese, and the second language was English.

As far as the skill to distinguish the sounds unique to English is concerned, there was a mild negative correlation between the age and the skill, supporting the original hypothesis.

In pronouncing sounds unique to English, the overall result was similar to that for the skill to distinguish the sounds. There was even stronger negative correlation between age and the skill to reproduce. However, in examining in more detail with regard to reproducing each sound, there were two tendencies: In pronouncing the sounds which are relatively easy for anyone to pronounce, sounds such as [ɑ:] and [æ:], [æ] and [ʌ], and even [l] and [r], the younger children were more successful than the older children. However, in pronouncing sounds which require more complicated motor skills, sounds such as [v] and [ʃi], the older children were more skillful than the younger children. Thus, in this particular case, the original hypothesis was not verified. However, since no comparison has been made with the learners of the ages after the Critical Period, it still holds true that the unfamiliar phonemes can be acquired before the Critical Period although the best age to master each phoneme might be different.

With this small exception, the original hypothesis "The younger the better in the acquisition of a second language phonemes" stands true. Therefore, in introducing English in the Japanese elementary school curriculum, a strong emphasis should be placed on teaching the correct English sounds. In the case of one child in the summer session (G2), since previously learnt incorrect English pronunciation was so strongly imbedded in the brain, this child was never able to distinguish or pronounce the correct pronunciation.

It is hoped that as long as an early start in the English education is introduced, it is carried out in the manner which is beneficial to the children, not harmful to them.

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