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The Younger, the Better or the Older, the Better? Literature Review of the Age Issue

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1967年にLennebergによって臨界期説が提唱されて以来、多岐の分野において年齢と学習能力の関係について様々な研究が続けられている。言語学においても第二言語習得に最も適した年齢が存在するのか、そしてそれはいつなのか常に研究報告がなされている。一般的には子供と大人を比較した場合、子供のほうが第二言語を習得する上で有利であるという見解がされがちである。しかし現在までに「子供」「青年」「大人」それぞれが第二言語習得に有利であるという研究結果が出されていることはあまり注目されていない。そこで本論文はこの三つの年齢層が有利であるというそれぞれの議論を分析しまとめた。

It has been said that age has an effect upon second language acquisition—the so-called 'age effect'. The original notion derives from the Critical Period Hypothesis proposed by Lenneberg (1967) which claims that there is a period in one's life when language is learned in the most effective way. Since the proposal was made a great deal of research has been carried out in the areas of both first and second language acquisition. For second language acquisition, research tends to centre around immigrants, and compares the different learning patterns of children and adults (e.g. Asher & Garcia, 1968, Patkowski, 1980, DeKeyser, 2000). The above studies claim that children are better learners than adults in terms of achieving native-like proficiency, but there is contrary evidence showing that adolescents and adults can also achieve a high level of proficiency provided that instruction is given in a formal situation and the learners have a positive attitude towards learning the target language (e.g. Snow & Hoefnagel-Höhle, 1978, Asher & Price, 1967, Moyer, 1999, Bongaerts et al., 2000). This paper will introduce the previous studies of the age issue from three points of view, namely that children are the best learners, that adolescents are the best learners, and that adults are the best learners.

'Children Are the Best Learners' Argument

The most salient evidence in favour of children being the best learners is that of immigrants, probably because immigrants get full exposure to the target language. Another reason for the popularity of the study of immigrants is that it is possible to compare people of different age groups.

Especially the comparison between children and adults has been receiving much attention to investigate whether the age effect really exists in second language acquisition. For example, Asher and Garcia (1969) investigated the relationship between age of entry and length of stay with Cuban immigrants to the United States. Their finding was that age of entry had a stronger effect on immigrants' second language acquisition than their length of stay in the country. The subjects' age range was from 7 to 19 years, and most of them had resided in the United States for about five years. They were required to speak some sets of English sentences, and their recordings were mixed with those of 30 native speakers of English as control subjects. The speech was judged by 19 American high school students on a 4-point scale from 'native speaker' to 'definite foreign accents', focusing on pronunciation. Asher and Garcia found that none of the 71 Cuban subjects was judged to have native pronunciation. However, those who were deemed to speak with near-native pronunciation were those who entered the United States at an early age. They claim that children had the greatest probability of achieving a near-native pronunciation of English if they had been 6 or younger on entry and had

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lived in the United States more than five years. Children who entered United States when they were 13 or older had a smaller chance of acquiring a near-native pronunciation even if they lived there for five years or more. Children who were between 7 and 12 when they entered United States, then lived there for five years or more, had a 50-50 chance of acquiring a near-native pronunciation.

Other researchers who focused on the achievement of native-like pronunciation by immigrants were Seliger et al. (1975). The research was to investigate the English and Hebrew proficiency of immigrants to the United States and Israel respectively. Again the result showed strongly that the younger the age of entry into the country, the more successful the acquisition of L2. An interesting point of this research is that the subjects were required to judge their second language proficiency for themselves. The data was obtained by interviewing 394 adults who had migrated at various ages and from various countries. The questions consist of country of birth, age, age on arrival in the host country and distinguishability from native speakers of their second language. An analysis of these interviews showed that a majority of the subjects who had migrated at or under the age of 9 years reported that most people in their host country thought they were native speakers. On the other hand, most subjects who migrated at or over the age of 16 years reported that they were still felt to have a foreign accent. Half of those who migrated between the age of 10 and 15 years reported that their accents were still foreign, and the other half reported that they had no foreign accents.

Oyama (1976, 1978) also investigated native-like pronunciation, with 60 male Italian immigrants to the United States whose ages ranged from 6 to 20 years. There were different lengths of stay in the United States ranging from five to eighteen years. Her first experiment in 1976 investigated subjects' pronunciation. The subjects were required to read aloud a short paragraph and tell in English a frightening story that they had experience. The speech was recorded and then made into a 45-second stimulus tape to be judged by two American-born graduate students using a 5-point scale ranging from 'no foreign accent' to 'heavy foreign accent'. She treated the age of entry and the length of stay separately, and concluded that the age of entry to the host country has more effect than the length of stay. In her words, 'an extremely strong age at arrival effect..., virtually no effect from the number of the years in the United States factor, and a very small interaction effect' (Oyama 1976). She claims that those who entered the United States before the age of 12 had more chance of acquiring native-like pronunciation than those who entered later.

The same subjects were involved in her second experiment, which investigated their listening comprehension. 12 short sentences were recorded by a female native American narrator and it was played through headphones to the subjects. The aim was to test the subjects' ability to determine whether they were able to repeat the same sentence as that spoken by the narrator. Again the scores obtained revealed a clear age of entry effect. She claims that '...those who began learning English before the age 11 showed comprehension scores similar to those of native speakers, whereas later arrivals did less well; those who arrived after the age of 16 showed markedly lower comprehension scores than the natives' (Oyama 1978). She added again that the length of stay effect was not discernible.

So far we have considered immigrants' second language acquisition from the phonological point of view. The above research shows that age does have an effect on phonological achievement in second language acquisition. Immigrants' second

language proficiency in syntax and morphology will now be considered. The study done by Patkowski (1980) has often been cited as a good example of research into learners' second language syntactic proficiency and age. His subjects were 67 highly educated immigrants to the United States from various countries who had lived there at for least five years. All subjects were interviewed in English; transcripts of 5-minute samples of these interviews were submitted to two trained judges for assessment of syntax on a scale from 0 to 5. The results show a strong negative relationship between age of arrival and syntactic rating. Also he discovered that the 34 subjects who entered the United States before the age of 15 showed markedly better performance than those who entered after the age of fifteen. More precisely 32 out of 33 subjects in the former case scored 4+ to 5 level on the Foreign Service Institute (FSI). In the latter case only 5 subjects scored 4+ to 5 level and 8 subjects scored 2+ to 3 level. Such results show a marked difference in the distribution of scores for the two groups. In the case of adults scores were evenly distributed, with the majority at midpoints on the rating scale. In the case of children the scores tended to be at the high end of the rating scale, with 29 out of 33 achieving a rating of 4+ or 5. The distribution graphs from Patkowski's results have often been cited to show the difference in performance between children and adults.

In a further notable piece of research, Johnson and Newport (1989) conducted a study of 46 Chinese and Korean speakers who had begun to learn English at different ages. All the subjects were students or faculty at an American university and all had been in the United States for at least three years. There were 23 native speakers of English involved as control subjects. The subjects were given a 'grammaticality judgement' task that tested 12 rules of English morphology and syntax (verb tense, noun pluralization, verb agreement, word order, question formation, use of article and use of pronoun). The subjects were required to hear the sentences and to indicate whether or not each sentence was correct. Half of the sentences were grammatical, and the rest were not. The finding was that age of arrival in the United States was a significant predictor of successful second language acquisition. When they grouped the learners in the same way as Patkowski, (comparing those who began their intensive exposure to English between the age of 3 and 15 with those who arrived in the United States between the age of 17 and 39), they found a strong relationship between early language learning and performance in second language. Johnson and Newport claim that before the age of 15, and especially before the age of 10, there are few individual differences in second language ability. Older learners will be less likely to have native-like language skills and are more likely to differ greatly from one another in ultimate attainment.

A final important study on the morphological development of immigrants is Kessler and Idar (1979). Their subjects were a Vietnamese mother (who was presumably around the age of mid-twenties to thirties at the time) and her four-year-old daughter who migrated to the United States. This longitudinal and comparative study of their morphological development in English consisted of two stages to compare their development of six grammatical morphemes. The results of a comparison between the mother and daughter, in respect of their progress towards acquiring six grammatical morphemes between two stages, are as follows. In the mother's case none of the six morphemes studies was used more than 17% more accurately in Stage 2 than in Stage 1. But in the case of the daughter improvements of up to 74% were recorded. Kessler and Idar claim, 'Clearly the

daughter's Stage 2 represents a higher level of L2 proficiency than that of the mother at either of her two stages' (Kessler & Idar 1979).

In addition to the above studies, researchers such as Tahta, Wood, and Loewenthal (1981) and Thompson (1991) have shown similar results. An interesting finding from these studies is that although there are those who lay emphasis on the length of the stay in the host countries as a predictor of successful second language acquisition (i.e. Ekstrand, 1976, Snow and Hoefnagel-Hoehle, 1978, Bialystok, 1997), when the issue is focused on the proficiency of native-like pronunciation, the age of arrival in the host countries is considered to be a stronger predictor. The age range of the subjects in these studies varies from 6 to 20 in Oyama's study, 5 to 50 in Patkowski's, 6 to 15+ in Tahta et al.'s, and 4 to 42 in Thompson's. The finding of a strong linear relationship between accent rating and arrival age (with length controlled) has nonetheless been consistent, with the youngest child arrivals up to about age 7 typically achieving native or near-native ratings while adult arrivals rarely rise to a near-native level of performance.

However, a problem in the research with immigrants is the wide age range in the young learners group. Although the subjects are grouped as children (as opposed to adults), the age range varies from one piece of research to another. (i.e. 6 years in Asher and Garcia's study, 9 years in Seliger's study and so on.) Also, although the exposure to the target language might be rich in such a natural setting, the quality and the quantity of that exposure differ according to the subjects' situation. In other words, the setting is not formally controlled.

Research carried out by Yamada et al. (1980) might solve this problem. Their study was conducted in a school and investigated different age groups in a formal classroom language learning setting. The subjects were 30 Japanese elementary school pupils, and the experiment investigated the subjects' success in learning a small selection of English words. Out of 40 mono- and di-syllabic English words, four were given to each subject with corresponding pictures to remember. Two sessions were given with a 24-hour interval between. The finding was that the older the subject, the lower the score. An interesting point is that even the young learners' group showed the same tendency, supporting the argument of 'the younger, the better'.

A similar tendency of younger pupils performing better is found in Brega and Newell (1965) which compared the level of proficiency in French. Some of the subjects had started French with the FLES (Foreign Language in the Elementary School) programme and others had not previously learnt French at all. The finding was that those following the FLES programme performed significantly better in Modern Languages Association Foreign Language Tests. However, the study has been criticised as irrelevant because of a significant difference in the amount of exposure that the two groups received. Obviously those on the FLES programme received two years more exposure than the non-FLES subjects.

We have seen the supporting evidence of 'children are the best learners' argument. The research introduced here all seemed to be reasonable; especially in relation to pronunciation, the bulk of the evidence did suggest that children were much better than adults in the mastery of native-like fluency. One question left however is that since such studies were based on immigrants or similar category, the two groups of subjects compared were not exactly in the same situation to learn a second language. Firstly the place where second language exposure took place differed. For instance children might have learned the target language in a formal

way in school, while adults might have learned it through their work and so on. Although adults have had an opportunity to learn the target language through formal instruction, it would have been a different kind from the children's. Adults would need more practical instruction in order to adjust to a new life and work environment and it would definitely differ from the one used to teach children at a very basic level. In other words adults may have built their second language skills up in as minimal way as possible just to communicate with people in the target country. Secondly, children and adults have different L1 competence. Adults would have had their L1 by the time they entered the host countries and would have used it in acquiring the target language, while children may not have developed their L1 as well as adults had. Thirdly, their psychological states should be considered. While children would have entered the target culture not having too much anxiety, adults would have had many more aspects to consider. In the case of children, socialisation would have taken place only within a limited situation such as school and playground, while adults would have faced many varied situations needing the second language skills. At this point it is difficult to say that age is the only element which affects second language acquisition.

Backgrounds of each study are summarised in Table 1. Method, test and results will be summarised later together with the other sections.

Table 1 shows the various attempts to investigate the age effect. Each study shows an interesting method each with its own strength and weakness. Firstly, the number of subjects seems to be reasonable in each study, except for Kessler and Idar (1979) in which only took two participants as subjects. However, their study is the only one which concentrates on longitudinal and comparative data, and shows a different rate of morphological development between mother and daughter. Probably it would have been more valid if more subjects had been used.

Secondly, most of the studies in this area used immigrants as subjects. As mentioned earlier, one reason is probably that a good comparison can be made between children and adults. Having children and adults as subjects automatically decides the starting point of L2 learning to be age of entry. This issue of whether it is appropriate to accept the age of entry to the target language country as a starting point of L2 will be discussed later. However, interestingly, the studies which considered age of start as a starting point (i.e. Tahta et al., 1981b, Yamada, 1980, Brega & Newell, 1965) also support 'the younger, the better' argument. Their studies were carried out in schools so that the subjects' age and learning experience could be controlled. Although they supported 'the younger, the better', this will be in conflict in the later sections with 'the older, the better' arguments, since a number of other researchers carried out similar experiments in schools and produced contradictory evidence. This is probably because in the research mentioned above not enough control was exercised over the subjects. For example, in Brega and Newell (1965) the subjects on the FLES programme and those who were not had different lengths of exposure to the L2, as we saw above. Also in Yamada et al.'s (1980) study, the method itself has some doubtful aspects, for example whether it is appropriate to refer to the recall of 4 English words after 24 hours as 'acquisition'.

Thirdly, the age range of the subjects must be mentioned. Most of the previous studies showed that around 10 to 12 is a desirable age to acquire native-like proficiency, although up to 15 it is still possible. However, the ages vary from one study to another. Nevertheless all the studies agreed that after the age of 16 it becomes more difficult to achieve native levels of proficiency.

Table 1. Review of 'Children Are the Best Learners' Argument

Study	Subjects	Age Range	No. of Subjs	L1	L2	Area of Study	L2 Start point	Method/Test	Result
Asher & Garcia (1969)	Cuban immigrants	7-19	71	Sp	Eng	pronunci-ation	entry to US	recording of pronunciation, judged by native speakers of English on 4-point scale	age of entry affects pronunciation, over 13 non-native
Seliger et al. (1975)	Israeli immigrants	adults VD ages	394	Heb	Eng	overall L2 proficiency	entry to US	interview of L2 proficiency, self judging of their native-likeness	effect on age of entry over 16 non-native
Oyama (1976)	male Italian immigrants	6-20	60	It	Eng	pronunci-ation	entry to US	repeating 12 sentences after narrator's voice	effect on age of entry over 16 non-native
Patkowski (1980)	highly educated immigrants		67	VDB	Eng	syntax	entry to US	recording of an interview, judged on 6-point scale	effect on age of entry over 10 non-native
Johnson & Newport (1989)	Students at US Universities.		46	Ch & Kor	Eng	syntax	entry to US	grammaticality judgement task	negative relationship between age and performance, but difference emerged between pronunciation and intonation. Pronunciation, over 11 non-native intonation, over 15 non-native pronunciation
Kessler & Idar (1979)	immigrants	mid-20's-30's and 4	2	Viet	Eng	morphology	age of start	longitudinal and comparative study of morphological development in English, two separate experiments compared six grammatical morphemes	mother gaining 17%, while daughter gaining 74% from the first experiment
Tahta et al. (1981)	immigrants from VD countries	VD ages	109	VDL	Eng	intonation	age of entry	read-aloud passages & responding questions were tape recorded, judged on 3-point scale	the older, the lower the scores, over 11 non-native
Brega & Newell (1965)	elementary school students	grade 3 and high school	32	Eng	Fr	overall French proficiency	age of start	comparison between FLES (age 9) and non-FLES students (age 14), tested on MLA Foreign Language Tests	those who started at an early age outperformed those who started at an older age FLES > non-FLES, grade 3 > high school
Yamada et al. (1980)	Jp Students	7, 9 & 10	30	Jp	Eng	Vocab	age of start	teach 4 Eng words and test recall 24 hours later	The older the age, the lower the score
Thompson (1991)	Rus Immits			Rus	Eng	Pron	Age of entry		before 10 more chance of native like accents

Sp=Spanish, Heb=Hebrew, It=Italian, Ch=Chinese, Kor=Korean, Viet=Vietnamese, Eng=English, Fr=French, Arm=Armenian, VR=various, VDB=various different backgrounds, VDL=various different languages, VD=various different, S=subjects

Before moving on to the counter argument which claims that 'adults are the best learners', the notion which claims that 'adolescents are the best learners' is going to be introduced, to which researchers such as Snow and Hoefnagel-Höhle (1978) attach great importance.

3. "Adolescents Are the Best Learners" Argument

While subjects are commonly divided into 'children and adults' or 'younger and older', another transitional group needs to be considered: adolescents around 15 years old.

Probably the first good example of this line of thinking is Snow and Hoefnagel-Höhle (1978), which was carried out in Holland, among English speakers who were learning Dutch as a second language. What made their research especially valuable was that the subjects used in the experiment included three age groups, that is to say, children as young as 3 years old, adolescents and adults. Furthermore a large number of different types of language use and language knowledge were measured and analysed such as pronunciation, auditory discrimination, morphology, sentence repetition, sentence translation, sentence judgement task, Peabody Picture Vocabulary task, story comprehension task and story-telling task.

Let us move on to their actual study. The age ranges of each group were (1) children aged from 3 to 10, (2) adolescents aged from 12 to 15 and (3) adults aged from 18 to 60. The children and adolescents attended Dutch schools. Some of the adults worked in Dutch work environments, and most of their Dutch colleagues spoke English well. Other adults were parents who did not work outside their homes and thus had somewhat less contact with Dutch people than most of the other subjects. The experiments were carried out three times, at intervals of four to five months. The first one was within six months of their arrival in Holland, and within six weeks of their starting school or work.

Snow and Hoefnagel-Hoehle compared the results of the first and the third tests of each group. The finding was that adolescents were the most successful learners on both occasions. They were ahead of every other age group except for the first pronunciation task. (In the pronunciation task, adults were ahead of adolescents.) Adults came second and children showed an unexpected poor performance in the first tests. Thus adolescents and adults proved that they are able to learn a second language faster than children in the first few months of exposure to the Dutch language. However, children performed better later in pronunciation, story comprehension and story telling, showing that they were good at long-term learning. Nevertheless it was adolescents who achieved the highest levels of performance overall.

Table 2 shows a general description of the result obtained by Snow and Hoefnagel-Hoehle (1978). 'X' indicates the best performers at the first test and 'Y' for the third test. * indicates that the test could not be done.

Unfortunately as some of the tasks (sentence translation and sentence judgement) were too difficult for children to understand, the comparisons between each group are not as precise as they should be. However what can be concluded from this study is that adolescents and adults are 'faster' learners than children in the early stages of second language development, and children eventually catch up and even surpass them if their exposure to the language takes place in contexts where they are surrounded by the language on a daily basis. In other words adults and adolescents learn at a faster rate, while children, although learning more slowly, eventually surpass adults and adolescents in achieving a near-native standard.

Table 2. Results from the Study by Snow & Hoefnagel-Höhle (1978)

Task	Child	Adolescent	Adult
Pronunciation	Y	Y	X
Auditory Discrimination		XY	
Morphology		XY	
Sentence Repetition		XY	
Sentence Translation	*	XY	
Sentence Judgement	*	XY	
Peabody Picture Vocab. Test		XY	
Story Comprehension	Y	X	
Story Telling	Y	X	

(Cited from Lightbown & Spada, 1993)

Other similar results were found by Tahta et al. (1981b) and Politzer and Weiss, (1969): In Tahta et al., the subjects were aged from 8 to 11, 11 to 12 and 13 to 15, and in Politzer amd Weiss's case, 7, 9, 11, 13 and 15. Again the older subjects outperformed the younger ones. This type of study was also carried out in the FLES scheme (Foreign Languages in Elementary School) to investigate the most suitable age to introduce foreign languages in school. Ekstrand (1976) reports the results in Swedish primary schools teaching English as a second language, Grinder et al. (1961) Japanese taught in Hawaiian schools, Dunkel and Pillet (1962) French in American elementary schools, Oller and Nagato (1974) English in Japanese schools in America, and finally Burstall et al. (1974) French in English and Welsh schools. The finding was that the older the subjects, the more efficiently a second language was acquired. One criticism of these studies is that the groups of subjects who were compared did not always have the same background. Obviously those who enrolled as FLES students had a longer exposure to the second language than those who did not. However, an interesting finding was that even though the Non-FLES students did not have any exposure to the second language in the course of this research, in the end they outperformed the FLES students in many aspects of second language acquisition. In fact in Oller and Nagato's case older subjects were able to learn as much in five years as younger subjects in 11 years. Therefore the researchers claim that the older subjects (adolescents in this case) learn a second language more effectively than the younger subjects (children).

Of course there are other criticisms of this type of research. For example, Stern (1976) and Buckby (1976) take issue with Burstall et al. (1974) because this type of school-based study is inconsistent in explaining the results cited in intrinsic maturational terms whilst other possible explanations in terms of the environment, sex and social class were revealed by other parts of the study. Stern (1976) also points to the possible blurring effects of mixing experimental and control subjects within the same classrooms, and Buckby (1976) criticises the nature of the test itself. However, from other experiments conducted in several other parts of the world, it is evident that adolescents are better learners than young children in formal second language instruction.

The research looking at 'adolescents are the best' section is summarised in Table 3 as in the previous section.

Table 3. Review of 'Adolescents Are the Best Learners' Argument

Study	Subjects	Age Range	No. of Subjs	L1	L2	Area of Study	L2 Start point	Method/Test	Result
Snow & Hoefnagel-HÖhle (1978)	English residents in Holland	3-60		Eng	Dut	pronunci-ation, auditory discrim., morphology, sent. repetition task, sent. translation, sent. judgement, Peabody Picture Vocab Task, story compr., story telling task	age of start	3 experiments having intervals of 4 to 5 months,	adolescents the best age, 12 to 15 being best
Ekstrand (1978)	Swd primary school pupils	8-11	355	Swd	Eng	pronunciation	age of start	imitation of word and sentences were judged	improvement of scores linearly with age, age 11 being the best
Grinder et al. (1961)	Hawaiian primary school pupils	8-10		Eng	Jp	pronunciation	age of start	imitation of word and sentences were judged	improvement of scores linearly with age, age 10 being the best
Dunkel & Pillet (1962)	American elementary school pupils	7-12	20	Eng	Fr	grammar	age of start	tested based on FLES and non FLES comparison	non FLES pupils who were 5 years behind FLES got higher scores, specific ages not given
Tahta et al. (1981b)	Students residentin England	5-15	231	Eng	Fr.& Arm	intonation	ageof start	imitation of words and short phrases in Fr & Arm, judged on 4-point scale	for pronunciation the younger, the better, for intonation, the older, the better
Oller & Nagato (1974)	Jp. female schoolpupils	13-17	233	Jp	Eng	overall Eng proficiency	age of start	comparison between FLES and non FLES	non FLES pupils over took FLES pupils,age 17 being the best
Burstall et al. (1974)	English and Welsh pupils	8-16	17000	Eng	Fr	speaking, listening and writing	age of start	tested subjects' reading, writing, listening and speaking skills	older pupils performed better than younger pupils
Politzer& Weiss(1969)	American schoolpupils	7,9,11,13 and 16	approx 250	Eng	Fr	discrimination, pronunciation recall tests	ageof start	judged by native speakers	general improvement of scores with increasing age
Snow & Hoefnagel-HÖhle (1978)	English residentin Holland	3-60		Eng	Dut	pronunciation, auditory discrim., morphology, sentence repetition task, sent. translation, sent, judge-ment, Peabody Picture Vocab. Task, story comprehension, story telling task	age of start	3 experiments having intervals of 4 to 5 months,	adolescents being the best age 12 to 15 being the best
Ekstrand (1978)	Swd primary school pupils	8-11	355	Swd	Eng	Pronciation	age of start	imitation of words and sentences	improvement of scores linearly with age, age 11 being the best

(Dut=Dutch, Swd=Swedish, Eng=English, Jp=Japanese, Fr=French)

What can be seen is that most of the studies have a fair number of subjects, especially the staggering figure of 17,000 in Burstall et al. (1974). The twenty subjects in Dunkel and Pillet (1962) may be too small compared to such a large-scale investigation. Regarding subjects' L1 and L2 backgrounds, the L1 of most of the subjects' was English, except for Ekstrand (1976) and Oller and Nagato (1974) which had Swedish subjects learning English and Japanese subjects learning English respectively. Also those who speak English as L1 were from US and UK, yielding an interesting mixture of the subjects' L1 and L2 backgrounds. The three studies investigated overall proficiency (i.e. Snow & Hoefnagel-Höhle, 1978, Oller & Nagato, 1974, and Burstall et al., 1974), while the rest concentrated on pronunciation, grammar, auditory discrimination and pronunciation. In general the comparison had good coverage.

One point which needs to be discussed is the subjects' age range. As mentioned earlier, since all the research was carried out in schools, the age of the subjects was well controlled. In other words, it was possible to choose subjects who did not have any previous experience in learning the L2, and subjects who started learning the L2 at the same time with the same exposure. However, although in most of the studies the starting point of learning L2 was around the age of 8 years, except for Snow and Hoefnagel-Höhle (1978) and Oller and Nagato (1974), the upper age varies from one study to another. For example, Ekstrand (1976), Grinder et al. (1961) and Dunkel and Pillet (1962) took 10, 11, and 12 years old as the oldest respectively, while Politzer and Weiss (1969), Oller and Nagato (1974) and Burstall et al. (1974) considered 15, 16 and 17 as the oldest respectively. The question that arises here is whether the age around 10 years should be called 'adolescent'. Adolescent is usually associated with puberty, which is very unusual at age 10. Although the results from the former three studies (i.e. Ekstrand, 1978a etc.) show that the older subjects performed better than the younger ones, this age group of around 10 years overlaps the area in 'children are the best learners' argument. The three studies do show that the older subjects performed better than the younger ones, but if there were even older subjects to compare (i.e. older than 12 years old), the result could end up the same as the 'children are the best learners' argument.

Also when we look at the latter studies (i.e. Politzer & Weiss, 1969 etc.), the same thing can be said. The upper age in these studies was around 16. Subjects around the age of 16 can be called 'adolescent', however there are no subjects of later age to be compared in these studies, either. If they were compared with the older age group, would the result still be the same? Therefore it seems difficult to conclude that adolescents are the best learners from these studies. Rather it should be rephrased as 'older children are better than younger children'. Yet Snow and Hoefnagel-Höhle (1978) used an age range from 3 to 60 years old, and as seen in the Table 2.4, the comparison and results seem clear. Therefore this study may be the only convincing one to show that adolescents are the best learners.

4. "Adults Are the Best Learners" Argument

This section looks at some studies that show that adults are the best second language learners.

The first example is Asher and Price (1967), involving child subjects from the age range of 8, 10, 14 years and adult subjects who were undergraduate students. None of the subjects had had any prior experience of the experimental target

language, Russian. In three short training units subjects listened to taped commands in Russian and watched them being responded to by an adult model. Half the subjects simply observed, while the other half imitated the model's actions. Each session was followed by a retention test in which each subject was individually required, without benefit of a model, to obey Russian commands heard during training. The results show that the adults on average and at every level of linguistic complexity consistently and dramatically outperformed the children and adolescents. The differences between the two groups of subjects were relatively small; however a positive relationship was found with increasing age.

The second study is Thorndike (1928) which focused on adults' outstanding performance in a formal second language exposure. Throughout, it shares similar results, namely adults outperformed younger learners. One of Thorndike's experiments was carried out in two evening schools to test students' French learning ability. The age groups compared were those whose ages ranged from 14 to 16, 17 to 19, 25 to 29 and over the age of 30, against those whose ages ranged from 20 to 24. The gains made in standardised tests were measured and the results, compared with the 20-24 age group, were; 14-16, 59%, 17-19, 86%, 25-29, 86%, and 86% was gained by those over the age 30. In short, adults aged 25 to 29 and over 30 gained the most. A similar tendency was also seen in German, Latin and Spanish.

The third group of studies introduced here is Neufeld (1977, 1978, and 1979), which investigated whether adult second language learners can achieve native-like proficiency by intensive training. His subjects were 20 Canadian university students whose ages ranged from 19 to 22 and they were tested on Chinese and Japanese pronunciation. They were given 18 hours of intensive sound pattern training and were asked to repeat ten short phrases in each language five times. The pronunciation was recorded and judged by three native speakers on a 5-point scale. Nine subjects were judged to have native-like pronunciation in Japanese, and eight subjects were judged to have native-like pronunciation in Chinese. This led Neufeld to conclude that adults can achieve native-like proficiency. Although his study is often cited as showing adults are able to learn a second language, there have also been some criticisms of its methodology. For example, Scovel (1988) and Long (1990) have pointed out first of all, that when the subjects whom Neufeld claimed to have scored 5 ('unmistakably native speaker with no sign of interference') or 4 ('appears native with occasional English-like sounds') were re-analysed, only one subject scored a perfect score in both languages and two more subjects in Japanese only. Secondly the judges were misguided by being given false information about the subjects. They were not informed that any recordings were made by English speaking subjects, but were told that the recording was made by Chinese and Japanese immigrants whose pronunciation might have been affected by their usage of English. Thirdly there were no control subjects of either Chinese or Japanese native speakers. Lastly what the subjects pronounced was just patterns of sounds, as they were not informed about the meaning or the grammatical structures of the phrases. Therefore at best it can be said that those adults who were able to pronounce the phrases have not lost the ability to imitate unfamiliar sound patterns. From all these points of view, this study has not been recognised as good evidence to support adults being good second language learners.

However, the fourth study by Bongaerts et al. (1995) shows, in a much more sophisticated experiment, the possibility of adults being able to achieve native-like pronunciation. The twenty-seven subjects used in their study were divided into

three groups. The first group consisted of five (ages ranged from 21 to 43 years) average native speakers of English who had university backgrounds and spoke 'neutral' British English with no noticeable regional accent. The second group consisted of ten native Dutch speakers (ages ranged from 23 to 52 years), who were said to be successful English learners with excellent writing and speaking skills. They were either students learning English or teachers of English at a Dutch university. The final group consisted of twelve native Dutch speakers (ages ranged from 19 to 43 years), who were also engaged either in studying or in teaching at a Dutch university, but who, in comparison to the first group (the excellent group), had a strong accent when speaking English. It was considered to be a good comparison to the first group and to induce the judges to use the entire range of the rating scale. All the subjects started learning English around the age of 12 and had seven to twelve years of learning history. None of the subjects had visited English-speaking countries before the age of 15 and none of them had any contacts with English-speaking people before the age of 12. Four experiments were carried out to test subjects' pronunciation skills and the results were judged on a 5-point scale by four native speakers of Dutch. The result shows that adults are able to pronounce a second language in a native-like way. The judges found the pronunciation of group 1 (native speakers of English) and group 2 (excellent English learners) impossible to distinguish. To clarify, those who were in group 2 were engaged with either learning or teaching English in a Dutch university and were considered to be excellent because of their frequent use of English in an intensive way. What can be concluded is that although learners start learning a second language after the age of 12, which was argued to be beyond the borderline for acquiring native-like foreign pronunciation, it is possible to achieve native-like level of proficiency with intensive phonetic training. Bongaerts et al. (1995) note several possible reasons for the results. For example one reason that group 2 (excellent English learners) scored high scores similar to that of group 1 (native English speakers) was the background of group 1. The native English speakers were considered to have a 'neutral' British accent, but because of a variety of different accents, the judges might have been misled by unfamiliar varieties since all the judges were based in York, in the north of England. Another point Bongaerts et al. made was that the subjects' first language was Dutch, which belongs the same group of Germanic languages and this could have given the subjects some advantage. However, this study is included in this section as good evidence to illustrate that adults are able to achieve native-like levels of pronunciation. Bongaerts et al.'s (2000) latest study also shows evidence of successful adult L2 learners to reinforce the notion.

Recently more studies have investigated adults' ability to acquire native-like proficiency in L2. One such study is that of Moyer's (1999) investigating the subjects' L2 proficiency in German. The majority of the subjects who started learning German after the age of 11 did not overlap with native German pronunciation, however, one subject in particular was, in Moyer's words, 'more native than one of the native speakers!' (Moyer, 1999, p.98). This particular subject started learning German at the age of 22 and was largely self-taught. He had no other language than his L1, English. What makes him different from the other subjects is his strong desire to acculturate and sound like a German. What can be concluded here is that with high motivation and effort, one can achieve such a high level of proficiency in L2 even if he/she starts learning it as an adult.

Another recent study is that of Marinova-Todd et al. (2000). They review the previous literature in this area and strongly suggest that there are some misinterpretations on adult learners being unsuccessful in L2. In their conclusion they firstly claim misinterpretation of observations of child and adult learners. Against the belief that children are much faster and more efficient learners of L2 compared to adults, Marinova-Todd et al. claim that children learn a new language with less speed and more effort than adolescents or adults. Secondly, they argue the misinterpretation of language proficiency in terms of neuroscience. At this stage there is a paucity of data available on brain function in early versus late bilinguals. The last misinterpretation Marinova-Todd et al. claim concerns the insufficient 'learning package' that adult learners have when learning an L2. They claim that with sufficient motivation, commitment of time and energy and support from the environments in which they find themselves, to expect high levels of success, adult learners do indeed achieve a high level of L2 learning. Marinova-Todd et al. attach great importance to these issues, and suggest that future L2 teaching and bilingual education should not perpetuate the same misconception, that is to say that adults are unsuccessful in L2 learning.

The last study in this section is that of DeKeyser (2000), which investigated Hungarian immigrants to the United States. The subjects ranged in age from 16 to 91, and were tested for their grammatical ability and aptitude in learning English. The results show that none of the adult subjects had a native level of proficiency; however those adults with a high level of verbal analytical ability reached near-native competence in their L2 learning. What makes this study interesting is the finding that children and adults use different mechanisms to learn an L2. This study was designed to test the Fundamental Differences Hypothesis proposed by Bley-Vroman (1988), which claims that children are known to learn language almost completely through a domain-specific mechanism, while adults use an alternative mechanism, such as problem solving, to learn an L2. DeKeyser (2000) tested the above hypothesis by providing evidence that no adult subjects reached a native level of competence in L2 morphosyntax unless they had been able to rely on explicit, analytic, problem solving capacities.

This completes the 'adults are the best learners' section. The studies introduced here are summarised in Table 4 as in the previous section.

What can be seen in the above table are good challenging arguments against 'the younger, the better' argument introduced in an early section. However, one approach which has to be noted as an exception is that of Neufeld (1977, 1978, 1979), though there are problems with its methodology. But the rest of the studies have a fair number of subjects and organised methodology in general. In terms of age variation, none of the studies, apart from Asher and Price (1967), compare different age ranges (e.g. age 8 to 14, and adults), but comparison is only made within adult age ranges. It would, however, have been better if the results had been compared with a group of children in terms of investigating adults' ability in learning L2. Yet, even as they are, the methodologies provide evidence that adults are also able to learn L2 successfully.

In this 'adults are the best learners' argument, most of the studies used age of start as the L2 starting point, apart from DeKeyser (2000), while in the previous section of 'children are the best learners' most focused on age of arrival. Although DeKeyser (2000) shows interesting results of different mechanisms used by children and adults, the actual results remain similar to those of immigrants' studies seen in

Table 4. Review of 'Adults Are the Best Learners' Argument

Study	Subjects	Age Range	No. of Subjs	L1	L2	Area of Study	L2 Start point	Method/Test	Result
Asher& Price(1967)	96 pupils&37col legestudents	8,10,14 and adults	133	Eng	Rus	command response	ageof start	comparison between with or without command how effective the command can be	adults performed better than children
Thorndike (1928)		1444	48		Esper-anto	vocab. reading, speaking	age of start		age group 17 to 30+ outperformed 14 to 16
Neufeld (1977, 1978, 1979)	Chinese and Japanese adults	1922	20	English French	Chinese Japan-ese	pronuncia-tion	age of start	intensive training on sound pattern, judged by native speakers on 5-point scale	9 subjs. Scored native rate in Jp, 8 scored native rate in Ch.
Bongaerts et al. (1995, 2000)	Dutch university students & lecturers	1952	27	Dutch	English	pronunci-ation	age of start	4 types of reading tests, judged by native speakers on 5point scale	adults can achieve native-like level of pronunciation
DeKeyser (2000)	Hungarian immigrants	1681	57	Hungar -ian	English	grammar, aptitude test	age of arrival	grammaticality judgement test, recorded sentences judged correct or wrong by the subjects	some adult learners achieve high level of proficiency in grammar
Moyer(1999)	graduate students		24	Engish	German	pronuncia-tion	age of start	read a list of words, sentence, paragraphs, judged on 6-point scale by native speakers	continuing gradual decline between age and performance, except for one particular subject showing native-like performance
Asher& Price(1967)	96 pupils & 37 college students	8,10,14 and adults	133	English	Russian	command response	ageof start	comparison between with- or without-command how effective the command can be	adults performed better than children
Thorndike (1928)		1444	48		Esper-anto	vocab. reading, speaking	age of start		age group 17 to 30+ outperformed 14 to 16
Neufeld (1977, 1978, 1979)	Chinese and Japanese adults	1922	20	English French	Chinese Japan-ese	pronuncia-tion	ageof start	intensive training on sound pattern, judged by native speakers on 5-point scale	9 sub. Scored native rate in Jp, 8 scored native rate in Ch.
Bongaerts et al. (1995, 2000)	Dutch univ. students and lecturers	1952	27	Dutch	Engish	pronuncia-tion	age of start	4 types of reading tests, judged by native speakers on 5-point scale	adults can achieve native-like level of pronunciation

'children are the best learners' section, that is to say that in a situation where only natural exposure is available, adults do not achieve native-like proficiency as well as children do. Therefore it can be concluded from these studies that with formal instruction adults do learn L2 successfully. As Marinova-Todd et al. (2000) argue, with the right L2 learning package such as high motivation, encouragement, time and effort, adults do acquire an L2 successfully. The subject who was rated to have native-like pronunciation in Moyer (1999) is a good example.

Summary

The purpose of this paper is to introduce three types of studies, which argue which age group has the most advantage in second language acquisition. It has been always believed that younger learners have advantage over older learners, and the idea is widely spread especially in educational field introducing second languages in school at an early age. However, considering the studies which show older learners' achievement, we can not say that it is always younger learners who acquire a second language most effectively. More research seems to be needed in order to find out which in which linguistics aspect children have more advantage over adults, or vice versa.

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