Investigating the Influences of Starting Age on Pronunciation: a Comparative Study of Chinese Learners of English As a Second Language

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Abstract: This study aims to test the validity of Critical Period Hypothesis (CPH) by investigating the influence of starting age on Chinese English learners' pronunciation. The study compares the degree of foreign accent of native Chinese English learners with different starting ages in learning English, in an attempt to determine whether early Chinese English learners could outperform late ones in terms of English pronunciation when exposed to an English-speaking setting. Furthermore, this research also proposes to investigate other possible factors that affect Chinese English learners' pronunciation. Participants were asked to provide spontaneous speech samples through semi-structured interviews conducted face-to-face or via Skype. In addition, an additional read-aloud task was required to ensure a more thorough and in-depth interpretation. The final results run counter to the Critical Period Hypothesis as there appeared to be late starters who also achieved native-like pronunciation, and there was no significant difference between early starters and late ones in terms of pronunciation. However, the study also yielded some results suggesting that greater efforts and stronger motivations were required for late starters in order to achieve the same pronunciation levels as early starters', indicating that starting age can be a sensitive rather than critical factor for second language (L2) pronunciation acquisition.
***Keywords*:** influence, starting age, pronunciation

1. Introduction

This study is set out with an intention of investigating the validity of Critical Period Hypothesis (CPH) by exploring the effects of starting age on Chinese English learners' pronunciation. For many decades, issues related to whether and how the onset age of a second language (L2) acquisition affect learning attainments have been constantly addressed by researchers (Bongaerts, Planken and Schils, 1995).

The claim that there existed an initial advantage for early starters over late ones in acquiring languages and accomplishing advanced levels of second language proficiency has been constantly debated and discussed by researchers within the domain of Second Language Acquisition (SLA) (Singleton, 2003). The undiminished investigation on whether and how the starting age influences a second language acquirer's performances have been frequently investigated, aiming at providing some reliable and valid evidences to set an optimum age of exposure to the target language for second language learners.

Furthermore, in the field of phonology, it has been proposed that, in spite of several exceptional cases of late learners who have also achieved advanced proficiencies in second language acquisition regarding to syntax, lexis and grammar, they still hold an accented phonological performance even after a long period of exposure to the target language (Bongaerts et al., 1995). This mismatch between morphological, lexical and syntactic proficiencies and accent was claimed by Scovel in 1981 as the "Joseph Conrad Phenomenon" (Scovel, 1981). Furthermore, the relations between age factors and the degree of perceived foreign accent has been constantly researched by experts in this field (e.g. Seliger, 1978; Bongaerts, Planken and Schils, 1995; Asher and García, 1969).

Furthermore, phonological production is considered as "the only aspect of language that has a neuromuscular basis" (Scovel, 1988, p101). Compared to older children and adults, a younger child's articulatory organ can be more flexible and adjustable to new linguistic sounds (Tarone, 1987), thus is commonly held responsible for the alleged view that "younger is better" (Krashen, Long and Scarcella, pp. 574). Based on this, in 1959, Roberts and Penfield along with Lenneberg in 1967 presented the assumption of Critical Period Hypothesis (CPH), indicating that beyond the onset of puberty, the acquisition of a second language would be increasingly difficult and with the passing of time, the capacity for attaining a nativelike speech of a second language was hypothetically impaired (Lennerberg, 1967; Scovel, 1981; Mayberry et al., 1983). There appeared to be multiple reasons for this worldwide undiminished interest in the issue of age (Singleton, 2003), ranging from theoretical incentives such as whether a putative innate language capability continues to function after a specific maturational period, to very practical reasons such as at which specific age should the exposure to a second language introduction begin - an essential question concerned a lot by school educators presently (Johnson and Newport, 1989; Harris, 1992: Hyltenstam,

1992; Hyltenstam and Abrahamsson, 2000; Singleton, 2003).

Concerning the relation between the age effect and the attainments in second language pronunciation, many researchers investigated age effects on learners' phonological performances, especially sounds including vowels and consonants (Jia, and Aaronson, 1999; García Lecumberri and Gallardo, 2003; Fullana, 2006; Jia et al., 2006). These studies proved that age was not a crucial but an important factor that affect the development of second language pronunciation.

Besides, the difference between the learners' mother tongue language and L2 was strongly associated to their phonological production (Moyer, 2004). For most Chinese learners who learn English as a second language, the degree of whose phonological performances would be perceived as a noticeable foreign accent, as Chinese differs greatly from English with respect to phonology. Flege et al. claimed that, with the increase of age, L2 pronunciation was acquired through a L1 "filter" which could impede the attainment of phonology accurately and raise the degree of foreign accent in L2 (Flege et al., 1997, 1999, 2006).

Moreover, participants' exposures and learning patterns towards L2 can also be influential elements in terms of achieving high levels of pronunciation. Therefore, to investigate Chinese English learners' pronunciation, it is essential to understand how English as a second language is taught and processed in the Chinese educational system.

In the 1980s, the Chinese government initiated the policy of reforming and opening-up with the aim of strengthening interstate relations in the international system. English education has been allocated an increasingly significant role in language development to meet the urgency of China's reinforcement of interstate connections. The last decade has witnessed the introduction of English courses in elementary schools in China. Furthermore, with three classes per week, English is now considered as a compulsory subject from Grade three and beyond in the majority of Chinese elementary schools (Chinese Ministry of Education, 2001).

However, owing to the imbalanced distribution of English resources in China (Jia, 2006), the onset age of Chinese English learners is greatly different between developed and less-developed areas. Jia (2006) distinguished the learners' exposure to the target language according to rural and urban areas. Wang (2008) claimed the existence of a great gap between advanced and less advanced areas in terms of the starting age of learners' second language acquisition (in this case English). For example, learners from less advantaged areas may only be exposed to English instructions from grade 7 in secondary schools (around 13 years old) while learners from coastal cities or urban areas may start to learn English as a second language from preschool (around 3 years old).

Moreover, with a few hours of lessons per week, school teachers primarily focused on instructions concerning grammar analysis, endeavouring to impart written and reading skills in a limited time. With around fifty students in one classroom, normally there is no sufficient time for students to practice their oral skills, thus resulting in their lack of interests and confidence in producing utterances in the target language.

Motivated by the above discussions and questions addressed in the SLA and phonology fields, I became interested in whether and how the onset age could affect a Chinese English learners' phonological skills. In addition to the significance of phonological performances when assessing English abilities (Scarcella and Oxford, 1994), I have also picked up an interest in the importance of establishing an optimum starting age of exposure to English in China. Hence, in the current study, I conducted a related research with the aim of investigating the degree of perceived foreign accent of Chinese English learners with different starting ages, in order to answer the following research questions:

(1) Do early Chinese English learners achieve better English pronunciation than late ones in English-speaking settings?

(2) Which other potential factors could influence Chinese learners' pronunciation in English?

In the following section, a literature review concerning previous research under this topic will be thoroughly discussed. Subsequently, the design of this research, including participants, procedures, ethical considerations and data analysis will be outlined in Part three entitled "Methodology". The forth section consists of findings and a discussion on the basis of the collected data and results reported in part three. In addition, the answers to the two addressed research questions will be discussed in this section. Lastly, pedagogical implications along with the limitations of this study will be outlined in part five, and a self-reflection and conclusion will be included in this part as well, followed by some suggested directions for the further study.

2. Literature review

2.1 The critical period hypothesis

Age has been perceived as one of the most significant variables in language acquisition, the discussion on which has been a perennial theme amongst researchers, practitioners and second language learners within the field of SLA (Singleton and Lengyel, 1995). In 1959, Penfield and Roberts first introduced the idea of a critical period within the field of neurolinguistics,

but Lenneberg (1967) was generally considered as the "father" of the idea of the Critical Period Hypothesis (hereafter CPH). The term critical period for language acquisition refers to a period of time (usually before nine to twelve) during which language skills are usually achieved relatively easily and with a great degree of success (Marinova-todd, Marshall and Snow, 2000); a child before this age is a "specialist in learning to speak" (Penfield and Roberts, 1959, p. 235). CPH was considered applicable to language acquisition, not only second language but also learners' mother tongue language. Researchers supporting CPH also suggested that once this period was finished, usually hypothesised to be age 9 to 12, it was assumed that the average learner was less likely to achieve nativelike competence and performance (Penfield and Roberts, 1959; Ellis, 1994).

In 1967, Lenneberg examined the neurological completion of the human brain and underpinned the critical period assumption by claiming that, the process lateralisation in the brain was completed by the age of puberty and speech functions were then localised in the left hemisphere for the majority of language learners. He and his associates suggested that there were maturational constraints for language acquisition and, once the process of lateralisation was finished, the mastery of a language becomes more challenging and less possible. However, some experimental studies have provided contrary evidence to prove that the lateralisation of human brain is in fact accomplished by the age of five (Krashen, 1973, as cited in Marinova-todd; Hahn, 1987; Marzi, 1996; Marshal and Snow, 2000; DeKeyser, 2012).

A great variety of views concerning the validity of CPH have been expressed in the field of SLA. Although there were many studies which supported the existence of critical period (Scovel, 1988; Johnson and Newport, 1989; Long, 1990; Breathnach, 1993), such findings have been undermined by a range of further investigation and researches conducted with the intention of testing the validity of CPH (Birdsong, 1992; Ioup et al., 1994; Bongaerts et al., 1995; Moyer, 2004; Ortega, 2009). Therefore, researchers like Bongaerts and his colleagues, Long and Oyama encouraged the use of the term "sensitive period" instead of "critical period", indicating that the acquisition of language may have initial advantages favouring early starters, without denying the possibility of acquiring high levels of language performance after the period of heightened sensitivity, and noting that it varies depending on the individuals (Bongaerts et al., 1995; Long, 1990; Oyama, 1976).

2.2 Initial rate and ultimate attainment

One of the most important distinctions claimed in relation to the age and attainments of L2 is that the influence of age on rate had to be distinguished from the influence of age on the degree of ultimate attainment (Munõz, 2003). In 1979, Long, Krashen and Scarcella published a well-known review of age-related researches, in which they proposed three famous generalisations with regard to age, initial rate and the ultimate attainment in the field of second language acquisition. As proposed in this article, compared to younger acquirers, adults and older children are faster learners in terms of proceeding through the early stages of morphological and syntactical learning; while children who begin to be exposed to natural L2 settings during childhood generally possess higher levels of language proficiency than those late starters. Therefore, in 1979, Krashen et al. indicated that with the regard to initial rate, adults and older children possess certain advantages over younger acquirers; while younger children eventually surpass older learners concerning ultimate attainments in the long run, "when time and exposure are held constant" (Krasen, Long and Scarcella,1979, p.573).

The study conducted by Snow and Hoefnagel-Höhle in 1977 and 1978 was in favour of the initial benefits for adults. Snow and Hoefnagel-Höhle conducted an investigation to test the validity of CPH by assessing 51 native English speakers' language proficiency of Dutch consistently in their first year of immigration to Holland. Five participant groups were separated according to participants' age, among which the youngest participant was only 3 years old and the oldest group members were adults. All participants received a comprehensive language test concerning receptive skills and productive skills, amongst which the youngest group received the lowest scores while the teenage group received the highest. However, after a whole year's constant and natural exposure to the target language, younger starters eventually outperformed the older ones in terms of pronunciation. It was indicated by the study that certain initial advantages did favour older participants in acquiring a second language, but these advantages declined in long term study and younger learners would eventually surpass the older learners. Therefore, the age advantages favoured younger learners in ultimate attainments rather than initial rate. Moreover, this study yield evidence contrary to CPH by showing that amongst the five age groups, it was the teenage group (aged 12-15) rather than the youngest group (aged 3-5) who received the highest scores in the initial assessment, which failed to support the assumption that the critical period disappeared at the end of puberty.

Another interesting research worth mentioning concerning the ultimate attainments for late L2 learners within the phonological competence was conducted by Bongaerts, summeren, Planken and Schils in 1997. Instead of normal late L2 learners, a carefully screened group of highly successful late English Dutch learners were selected as participants. As Long (1990) and Patkowski (1990) pointed out in their literature review, there appeared to be possibilities that subject selection factors might influence the findings of studies testing CPH. Moreover, Long (1990) proposed that age-related studies favouring

late starters "speak only to differential rate of acquisition, rather than absolute abilities" (Long, 1990, p. 260). Therefore, very advanced learners should be included in order to increase the accuracy and ensure the reliability of studies concerning L2 acquisition (Long, 1990). The experiments designed by Bongaerts, Summeren, Planken and Schils (1997) provided valid support for late starters by proving that post pubertal acquirers could ultimately achieve a nativelike accent, which was considered impossible by proponents of CPH (Scovel, 1988). Three groups of subjects participated in this research. Group 1 (the control group) included five native Anglophones without a noticeable regional accent, group 2 included 10 highly successfully Dutch learners of English with an excellent level of English proficiency. Group 3 was considered an interference group consisting of 12 university students with varied levels of foreign accents in order to induce the judges to make full use of the ranking scale. None of the participants from group 2 and group 3 had received English input before the age around 12; hence they were considered late starters. Spontaneous speech samples and read aloud task excerpts were collected for four native British judges to evaluate. The most striking result received from the study was that the native judges could not distinguish the group of excellent learners from the native speakers, indicating that there appeared to be possibilities for post pubertal acquirers to ultimately attain a nativelike level of English in terms of phonological performance.

Furthermore, other research seems to prove that in short-term exposure, older learners indeed possess certain rate advantages compared to younger acquirers. For example, Ervin-Tripp stated in 1974 that after a nine-month's exposure to the target language, a group of 7 to 9 year olds received better grades compared to those aged 3 to 4, in aspects of reading comprehension, imitation and conversation. Besides, Asher and Price (1967) reported that adult learners performed better than older children (aged 7 to 13) in the listening tasks after a very short exposure to the target language. These findings can therefore be interpreted as the adults' advantage in terms of initial rates. In other related studies, older acquirers scored higher than younger ones in experimental listening comprehension tests (Ekstrand, 1976; Grinder et al., 1962). Students in grade 4 and grade 6 were compared by Florander and Jansen in 1969, suggesting that after 320 hours of exposure, the effects in favour of older children gradually decreased. Also, Fathma (1975) claimed in his experiment that compared to 6- to 10-year-olds, children aged 11-15 performed better with regard to phonological performance in the first year of acquisition. However, with three years of exposure, the latter group eventually outperformed the former. Larsen-Freeman and Long's (1991) literature review reported that second language acquisition over an extended period of time may favour younger starters who were capable of attaining a native-like level of proficiency in all aspects of the target language (i.e. phonology, syntax and semantics).

2.3 Effects of age on L2 phonological acquisition

Phonological performance refers to competencies or skills which second language learners need to grasp to communicate with an intelligible and accessible pronunciation (Scarcella and Oxford, 1994). In fact, phonological competencies, more than any other component of language, was given highly importance for revealing the relationship between individual competences and the universal role of language learning, as it relies "on both motor and higher analytical skills" (Moyer, 2004, p7). According to Scarcella, Oxford and their colleagues the types of phonological competencies consist of stress, rhythm, liaison, assimilation, and sounds (vowels, consonants, and consonant clusters). Gillette (1994) indicated that in order to further develop learners' pronunciation skills and reinforce their phonological acquisition, a basic understanding of phonological variables is needed, such as stress, intonation and liaison.

Some observations indicate that the critical period hypothesis has received particular support within studies on phonological competence (Scovel, 1988; Patkowski, 1990; Pennington, 1998). In 1988, Scovel claimed that pronunciation was considered as the only language feature "which is directly 'physical' and demands neuromuscular programming" (1988, p. 62). He demonstrated the relationship between age factor and language achievements concerning phonological attainments, suggesting that post pubertal acquirers could achieve native-like levels of L2 in terms of morphology and syntax, but could never pass themselves for a native-like accent in terms of L2 pronunciation. Scovel (1988) even suggested that phonological performance might be the only linguistic-related skill owning a critical period due to its neuro-muscular features. Admittedly, some proponents of Critical Period Hypothesis like Seliger (1978), Walsh and Diller (1979) particularly allocate a special space to the mastery of phonological competence as they perceive that phonological acquisition is a "lower process" which, unlike other language skills, is "dependent on early maturing and less adaptive macroneural circuits" (Walsher and Diller, 1979, p18). Cummins argued that late starters show higher mastery of the target language in terms of literacy-related skills mostly owing to their greater cognitive maturity. However, when it refers to communicative-related skills like oral fluency and pronunciation, they failed to show superiority as these "appeared to be among the least cognitively demanding aspects of both L1 and L2 proficiency" (Cummins, 1980, p180; Cummins and Swan and Smith, 1986, p88).

Furthermore, research into the relationship between phonology and age as an influencing variable has shown disparate findings over the years. Many researchers proposed that the age of exposure should be given great importance in language

acquisition and concluded accordingly that that the younger the learners are, the higher the level of phonological acquisition will be (Asher and García, 1969; Oyama, 1976; Flege et al., 1999). Researchers such as Klein (1986) only mentioned the effects of physiological variables for participants of high-levels of maturity, highlighting that compared to children, their auditory organs and neuromuscular development were fully-completed. The notion that ''earlier is better'' regarding phonological skills in SLA is generally accepted by scholars and practitioners (Singleton, 2001). As discussed by Snow et al. in 1978, it was widely-believed that children could master a L2 ''quickly, automatically, effortlessly'' in contrast L2 learning for adults were conducted ''slow, effortful, and often less than perfectly successful'' especially in phonological acquisition (Snow, 1978, p1115). Researchers like Scovel perceived age as the sole factor influencing a person's phonological acquisition of a second language, accounting for the emergence of accented speech after puberty (Scovel, 1988). Findings from my research will challenge Scovel's views, by proving that there appears to be possibilities for late starters to attain a native-like accent.

2.4 Effects of age on L2 pronunciation in different language settings

Up until now, practically all studies regarding the age effect on the acquisition of phonological proficiencies were conducted under two types of settings. One was under immigration setting, in which participants were immigrants with different onset ages of L2 acquisition (e.g. Snow and Hoefnagel-Höhle, 1978; Fathman, 1975; Slavoff and Johnson, 1983; Tsukada et al., 2005). The other was in English as a foreign language setting (hereinafter EFL settings), in which studies concerning the L2 acquisition consisted of foreign language learners with different starting ages in foreign language settings, i.e. a Mandarin setting and a French setting (e.g. Muñoz, 2006; García Lecumberri and Gallardo, 2003; Fullana, 2006; Jia et al., 2006; Jia, 2009).

In the following section, previous studies regarding English pronunciation in immigration settings and foreign language settings will be reviewed respectively to further explore the age influences on the acquisition of L2 phonological proficiencies.

2.4.1 Effects of age on L2 pronunciation in second language settings

Several studies were implemented under a second language setting. Tsukada et al. (2005) conducted a study concerning native Korean adults and children receiving English instructions in North America (3- and 5-year-olds), with a comparison of age-matched native English speakers acquiring English vowels. The authors found that Korean children with three years of residence could articulate English vowels more accurately than Korean adults but less accurately than native English children. Yeni-Komshian and his colleagues reported that the older the participants were when they settled in America, the less accurately (according to the native judges) they produced English utterance (Yeni-Komshian et al.,1997, as cited in Leather, 2003).

Snow and Hoefnagel-Höhle (1978) examined vowel articulation and word production under a naturalistic setting, the subjects of which consisted of native English adults and children aged 3 to 15 who learnt Dutch as their L2. After 6 months of residence in the Netherlands, the older group presented a nearly native-like performance which the younger group failed to surpass. However, the younger group received better attainments and finally overtook the older group after 11 months of residence.

Another piece of research worth mentioning was implemented by Ioup and her colleagues in early 1990s. They argued the validity and effectiveness of CPH by reporting an excepted case of Julie, a native British speaker designated as an exceptionally successful learner of Arabic. Julie had been exposed to the target language in her late twenties without receiving any formal instructions previously and, even though she could not read or write Arabic, she attained a native-like phonological proficiency after three years of residence in Egypt and scored within native speaker range when compared to native Arabs. Despite being considered as a talented language learner, researchers also attributed Julie's success to her high degree of motivation. Furthermore, Moyer's (1999) research underlined the importance of investigating age factor along with other influential variables, implying age of exposure — whether through instruction or immersion — only played a significant role when taking participants' motivations and the type of instructions they received into consideration.

2.4.2 Effects of age on the pronunciation in formal settings

In spite of many age-related researches favouring younger learners concerning L2 phonological attainments, several studies conducted in a formal setting (English as a foreign language) yield disparate findings by claiming early exposure to a second language in a formal instruction environment did not contribute to a better pronunciation (García et al., 2003).

Many studies implemented in formal settings also yield opposite results to the Critical Period Hypothesis (Bongaerts et al., 1995, 1997, 1999; García Lecumberri and Gallardo, 2003; Fullana, 2006). According to Bongaerts et al in 1995 and 1997, Dutch English learners who either majored in English at a Dutch University, or taught English at a Dutch university could attain accentless phonological performance in the target language despite a late starting age of foreign language learning. In fact, Bongaert et al. (1995) generally admitted that even though late starters who can attain a native-like accentless speech

were rare and exceptional, the findings of his studies confirmed the possibilities of achieving it. Besides, Bongaert et al. (1995, 1997, 1999) proposed that there might be age advantages favouring younger children in attaining L2 phonologically, but in favour of Long (1990) and Oyama (1976), they proposed the term "sensitive" instead of "critical", which did not exclude the possibility and, in turn, did not deny possible advantages for an early starter. García Lecumberri and Gallardo (2003) conducted a longitudinal study consisting of Basque-Spanish bilinguals in the Basque region of Spain with three different starting ages of L2 acquisition (aged 6, 8 and 11 respectively), implying that after approximately six years of formal instruction, participants who started learning English at the age of eleven showed distinguishably better sound pronunciation than those who started earlier (8- and 4-year-olds). Those who started at the age of eight, however, articulated better than those who started at the age of four. Findings and discussions received from the above mentioned researches were in favour of age advantage favouring older learners rather than younger ones in formal instructional contexts, even in terms of phonological skills (Burstall, 1975; Olson and Samuels, 1973). Therefore, the authors proposed that in a formal setting where English is considered a foreign language, an earlier starting age cannot contribute to significant advantages in L2 pronunciation in the assessments carried out. Fullana's research assessed the L2 phonological abilities of English of 40 native Spanish and Catalan speakers with different starting ages (6-, 8- and 11-year-olds) (Fullana, 2006). According to Fullana and his colleagues, a late starting age in formal learning contexts could contribute to a less accented production of English vowels. However, other researchers (Snow et al, 1977; García-Lecumberri and Gallardo, 2003) argued that this observation should be taken received with caution for the following reasons. First, there appeared to be no significant differences between the ratings of 11-year-old starters and 8-year-old beginners in terms of the pronunciation of English vowels. Besides, as in García-Lecumberri and Gallardo (2003) and Snow et al. (1977), none of the age groups' vowel pronunciations were rated as native-like, which in turn failed to favour any firm conclusions such as a late starting age benefits older starters in the L2 acquisition in terms of phonology (Snow et al,1977; García-Lecumberri and Gallardo, 2003).

Furthermore, Bongearts and his associates (1999) proposed in their three age-related studies (1995, 1997, 1999) that, motivational factors should also be considered as an explanation to a native-like L2 speech, as participants who ultimately achieved an excellent L2 phonological attainments were highly motivated learners of French (1999) and Dutch (1995, 1997). According to the interviews, subjects from the exceptionally successful group attached great importance to speaking L2 without a noticeable Dutch accent. Bongaerts further demonstrated that strong motivation could be regard as one of the variables that account for L2 acquires' success in passing themselves as native speakers phonologically. In further research concerning the relationship between the L2 phonological attainments and motivational factors, Moyer (1999) assessed the phonological ability of Anglophone graduates in Germany, who were designated as late starters and who were performing as German teachers at university level by the time of the investigation (Singleton, 2001). Similar oral production tasks as Bongaerts' (1999) were given to subjects and results were rated employing a five-point scale (Moyer, 1999). Findings from the experiment suggested that none of the subjects were rated as having native-like level of pronunciation except for one participant who expressed great interest in German culture and history. Moyer then further argued that age effects alone could not account for the ultimate attainments in terms of L2 phonological acquisition, other factors such motivation, personality and types of exposure should be taken into consideration as well (Moyer, 1999). My report will support this view by providing firm evidence in the last section.

Overall, the discussion and findings of age-related research above have stated that age, motivational factors and types of exposure can significantly account for the differences in L2 phonological attainments. These discussions are of particular interest and closely related to my final report, as such factors have hardly been analysed in relation to native Mandarin speakers' English pronunciation.

3. Methodology

As this study is set out to examine the age effects on Chinese English learners acquisition of phonology through a comparison between participants of different age groups, a qualitative research and comparative approach were therefore employed with an intention of collecting informative and detailed data concerning the subjects' previous learning experiences and exploring the final results in a greater depth (Mackey and Gass, 2005; Cohen et al., 2011; Davies and Hughes, 2014). Besides, the data collected from interview was investigated as to further explore other potential factors influencing a L2 learners' phonological accuracy.

3.1 Participants and sampling

As the research aimed to find out the answers in terms of the degree of effects of starting age and other influential factors in second language acquisition among speakers of the same L1 within the same language setting (Grosjean,1992; Cook, 1995), a purposive sampling was adopted in this study.

There were altogether 6 participants taking part in this research, including 3 late starters and 3 early starters. All of them are native mandarin speakers of English aged around 22 to 23. Subjects in Group 1 consisted of 1 male and 2 females who had been exposed to English no earlier than secondary school at or around 12, they were therefore designated as "late beginners" according to the definition of Critical Period Hypothesis (Lennerberg, 1967; Scovel, 1988). Group 2 consisted of 3 participants (2 males and 1 female) who received instructions in English from primary school with teachers who were non-native speakers of the target language. The existence of a clear gap between participants' starting age of learning English allowed to gain more informative and valid data in terms of whether there was a "biologically" - or more particularly, a "neurologically - based period" in second language acquisition disappeared after the onset of puberty (Lenneberg, 1967, p176).

The six adult participants were born and raised up in China and they have been studying in the UK for about 4 years by the time of the research. Presently they are doing a Master's degree in Manchester and London by studying all the curriculums in the target language along with other native English speakers. Except for the onset age, they therefore share the similar oversea living experiences and a presumably equal amount of exposure to the target language in a second language setting.

All participants were designated as advanced or proficient learners of English - judging from the high admission standards and language requirements of the participants' universities. Furthermore, as they have been living a second language environment for several years, a successive and naturalistic exposure to the target language could also benefit their speaking levels of English as they were expected to keep practising the target language communicatively with native speakers in their daily life. Following a suggestion by Long in 1990, this study included L2 learners with an advanced level of English. Successful acquirers were a better source of information when screening the participants since they could offer rich and informative data for in depth analysation. Furthermore, as highly successful learners had achieved high proficiency of syntactic and morphological skills, they could then further assess their learning experiences introspectively and therefore discuss interactively with the author (Moyer, 2004).

In total, this comparative study was considered in detail in terms of the selection of participants, as in order to provide more valid data for further analysis and discussion.

3.2 Procedure

Two different speech samples were collected from the participants by having them performing two assessments: semi-structured interview and a read-aloud task, all of which were audio-recorded and transcribed accordingly. The two chosen tasks were implemented on the assumption that different tasks may require participants' different degrees of self-monitoring with respect to their phonological performances (Bongaerts et al., 1995). With an increasing degree of self-monitoring on their phonological performances, participants would be more possible to show an accent-less and native-like pronunciation (Oyama, 1976; Dickerson and Dickerson, 1977; Tarone, 1979; Major, 1987, 1990).

As the research included an in-depth analysis of subjects' phonological skills along with other relevant learning experiences and personal details, a semi-structured interview was adopted as a primary source of information (Dörnyei, 2007). The interviews were conducted face-to-face or visa Skype, covering questions with regard to their language learning experiences, the type of instructions they received, as well as their perspectives on their spoken English and foreign accents. Six well-designed and open-ended interview questions were set out to extract fundamental and helpful information in a naturalistic and collaborative way, as they allowed subjects to have an extensive range of opinions to share interactively (Mcniff et al., 1996). Unlike structured interview which was limited by its pre-planned questions, semi-structured interview contained only a basic framework of themes which led the researchers to gain clear insight into the research and modify the direction of the question according to the subjects' answers (Kvale, 1996; Harrell and Bradley, 2009). The semi-structured interview could also contribute to building an easy and enjoyable interview atmosphere which allows the interviewers to share more relevant information with me openly and help me to understand their individual perspectives towards language acquisition.

A read-aloud task was assigned for all participants after the spontaneous speech collection. This task contained a 231-words reading text extracted from the New Cutting Edge: Intermediate. Subjects were instructed to read the text aloud at their normal rate of speech and they were allowed to browse the text generally before reading it aloud. This task was designed to determine some possible phonological differences between speakers' spontaneous speech and controlled speech, as they might perceive more or less foreign accent when performing tasks requiring repeated skills considering their different individual reading skills and reading habits (Thomas, 1991). Furthermore, as we mentioned above, subjects were required to perform the two tasks following the same order, as the two tasks allowed for various levels of self-monitoring (Dickerson and Dickerson, 1977). In fact, the spontaneous speech required the least of self-monitoring and read-aloud task required the

most, as the former emphasized more on communicative skills while the latter required more phonological skills. Subjects may show better performance in terms of the read-aloud task as it allowed them to focus on pronunciation without worrying about grammar and vocabulary (Tarone, 1979, 1988).

3.3 Ethical considerations

According to Rajib and Mou in 2014, Ethical considerations appear in different ways from research design to data collection in a qualitative research. Following the guidance of DiCicco and Crabtree, researchers need to have all subjects understand the nature of the study and agreed and signed a consent letter in advance (DiCicco and Crabtree, 2006). Considering the ethical issues of this study, I will abide by the ethical guidelines of educational research of British Educational Research Association (BERA, 2011).

Before the application of the study, I verbally discussed my research aims along with my research design with my participants to ensure they were aware of the nature of my study in advance. Subsequently, a written consent form along with a two-page outline of my research was sent to each participant. The consent form covers my research aims and research design, stating clearly that all participants would be interviewed individually and asked to perform a read-aloud task, the whole process would be audio-recorded and transcribed. They were requested to sign on it to show their consent to take part in this experimental project. Moreover, in conformity with the Data Protection Act (British Parliament, 1988), all the participants' personal information would remain anonymous, and they would be promised that any information which could help identify them was unmentioned throughout the study.

Before the face-to-face interview, researcher would again verbally ask for all the participants' permission to be audio-recorded in the research. All the participants were informed again that they have the right to refuse to answer any questions and withdraw the interview at any time without any consequence (Thomas, 2013). To make the participants feel more easy and talk openly with me, they were promised again that the recordings would not be listened to by anyone but me, and the transcription and audios would not be published or broadcasted anywhere for sure.

3.4 Data analysis

Following a suggestion by Dörnyei and Ushioda, data collected in the semi-structured interviews and read-aloud tasks need to be classified and grouped based on different themes and codes (Dörnyei and Ushioda, 2011). Results were analysed in different ways accordingly: speech samples excerpted from the tasks would be transcribed, interpreted and analysed according to different groups. After transcribing and annotating the recordings, a second listening was required to generate a general analysis and rate each participants' phonological skills for the first time. A five-point category of accent was employed to rate the participants' pronunciation (Bongaerts, et al., 1997; Neufeld and Schneiderman 1980), stated as:

1) Very strong Chinese accent for most English sounds;
2) Noticeable Chinese accents for many English sounds;
3) Slight Chinese accents for many English sounds;
4) Near-native accents except for a few occasional English sounds;
5) Native-like accents

Furthermore, a third listening of the audios was conducted to analysed the data in a greater depth. This time I focused particularly on the type of mistakes and some common pronunciation mistakes which mandarin speakers normally have, such as vowels sound /aɪ/ and consonant sound /θ/ and /ð/ (Swan and Smith, 2001). The interference of their L1 and other types of phonological features would characterise subjects' degree of accents specifically on a five-point scale, a British or American accent would be specified for the near native-like and native-like categories (Davies and Hughes, 2014).

Moreover, guided by Bongaerts et al. in 1997, there would be a forth listening to the recordings to further explore other potential factors influencing learners' phonological performance. Different variables influencing L2 pronunciation acquisition would be categorised and discussed in greater depth in the following chapter, along with a detailed analysis concerning the rated pronunciation of all participants (Thomas, 2013).

Inspired and guided by my tutor Dina Mehmedbegovic, a preliminary pilot test was carried out in advance to ensure the effectiveness and appropriacy of my study. Two non-participant Chinese English speakers who were also qualified subjects took part in the pilot study as to help me practice the procedure of the study and make some adjustments and improvements on my interview questions.

4. Findings and discussion

This chapter aimed at finding out the answers of the two research questions as well as providing a further discussion on the information emerged from the study. Therefore, a detailed and in-depth report on the participants' level of pronunciation

and factors influencing it was presented in this chapter. In order to answer the first research question, the first half of this chapter mainly focused on the analysis of the subjects' phonological performances gathered from the interviews and read-aloud tasks, evaluating the common features for each level of the subjects. The second half of this section specifically looked into the answers generated from the face-to-face interviews, interpreting other possible factors that could affect their pronunciation.

4.1 Analysis of the foreign accent

This part will particularly look at the first research question by presenting a detailed analysis of the subjects' pronunciation, the most common phonological features for each category will be reviewed and discussed in depth.

4.1.1 Analysis of the speech samples

Based on the five-point scale employed by Bongaerts and his associates in 1995, six participants were classified according to their phonological performances generated in interviews. Four subjects were rated at Level 3 and 4 with two participants at each. Moreover, one subject was designated as noticeable Chinese accent — thus in Level 2 and no one was considered very strong Chinese accent. One participant was placed at Level 5, indicating she has a native-like accent. Additionally, as I marked on the rating scale, the participant of the last category was considered American accent. Table 1 below presents a brief summary of the participants' ratings based on a five-point scale (Bongaerts et al., 1995).

Table 1. Category of pronunciation.

Five-point scale	Group 1 (Later starters)	Group 2 (Early starters)
1) Very strong Chinese accent for most English sounds;	0	0
2) Noticeable Chinese accents for many English sounds;	1	0
3) Slight Chinese accents for many English sounds;	1	2
4) Near-native accents except for a few occasional English sounds;	0	1
5) Native-like accents.	1	0

The most common phonological-related issues appeared in the interviews were issues concerning the pronunciation of English vowels and diphthongs, given by the English pronunciation patterns differs considerately from Mandarin pronunciation (Swan and Smith, 2001). Considering most of the consonant clusters have an approximate pronunciation with the consonants of Chinese pinyin (A Romanization system to help pronounce in Mandarin), the participants showed a better performance with respect to the pronunciation of English consonant sounds (Swan and Smith, 2001).

Given by the relatively high level of the subjects in terms of spoken English, there was no participant placed in the first category of the accent. According to Swan and Smith and Smith in 2001, some of the English vowel sounds resemble Mandarin phonemes but are not identical to them phonologically, hence cause the confusion between Mandarin vowels and English vowels, indicating that more effort is required to master an accent-less pronunciation (Chang, 2001). For example, the contrast between /u/ and /u:/, /i/ and /i:/ have no equivalent in Mandarin, speakers normally confuse pairs like "full" and "fool", "it" and "eat", without distinguishing long vowels between short vowels (Swan and Smith, 2001). Additionally, as there is no /æ/ sound in Mandarin, speakers turned to replace it with /ʌ/ or /e/, hence words like "happy", "bad" are normally pronounced as /'hepɪ/, /'bed/. Similarly, as the diphthong /ai/ has a close approximation in Mandarin vowel sounds, thus speakers have a tendency to pronounce it with a noticeable Mandarin accent, words like "I", "like" might be pronounced more towards Mandarin sound, leading to /'e/, /'lek/, which sound typically Chinese.

As for consonant clusters, issues frequently arise in the pronunciation of /θ/ and /ð/ as they do not occur in Mandarin phonemes. These two interdental non-sibilant fricatives are likely to be replaced by two other sibilant sounds in English, /s/ and /z/ (Chang, 2001). Hence words like "the", "there" and "think" are often pronounced as /'zə/, /'zeə/ and /'sink/, sound completely Chinese accented. Furthermore, since the aspirated consonants /p/, /k/ and /t/ are in fact voiced in Mandarin phonetical system, hence speakers tend to lose the voiceless features in English by pronouncing them with a slight schwa sound or a very short /u/ sound at the end of the consonants, thus words like "interest", "laptop" are normally pronounced as /'ɪnt(ə)rɪstə/ and /'læptɒpu/ with a strong Chinese accent.

The second category included one participant from Group 1 who had started learning English no earlier than secondary school, thus considered late beginner. Overall, the participants made similar mistakes as mentioned above, but less frequently than those maintained a very strong Chinese accent, a slightly better performance was showed in this category. Regarding the English vowels, there were clear distinctions between the long vowel sound /i:/ and the short one /i/ as the participant

could pronounce the word “it”, “is”, “this” accurately, but the differences between /u/ and /u:/ still cannot be identified from his pronunciation. Nevertheless, the /aɪ/ sound as in words “like”, “tired” were still frequently replaced by the approximated vowel sound in Mandarin, engendering in Chinese accented pronunciation like /’teəd/. Unlike Chinese phonemes in which the letter “e” is pronounced clearly, there are some words ending with a voiceless “e” in English (Chang, 2001), hence words like “time”, “like” “improve” were frequently mispronounced with a voiced “e” by the participant in Level 2.

Concerning the consonants, the participant in Level 2 showed a slight improvement in the voiceless consonants such as /p/, /t/ and /k/, pronouncing them accurately without adding any extra schwa or other vowel sounds in many words, sounding less Chinese. Interestingly, when I listened to the recordings for a second time, I found that he consciously pronounced /θ/ and /ð/ accurately in several less-frequent words like “worth” “math” when answering the interview questions. However, he pronounced them mistakenly as /s/ and /z/ for most of the simple words in phrases like “let me think about it”, “they signed up the class for me” and “something interesting”. Judging from his answers in interviews, the reason that he can produce those words accurately may partly due to his changing of a more phonologically-accurate English teacher in high school, indicating that the type of instructions may contribute to improvements in English pronunciation (Long, 1983).

The third level consisted of three participants with one from Group1 and two from Group 2 respectively. Compared to participant in level 1, they were rated as slightly Chinese accented for displaying a more accurate pronunciation for most English words. Some of the characteristics of the former participant were not replicated at this level, as a clear difference between long vowels and short vowels can be identified according to the recording samples. Most of the vowel sounds and consonant clusters were pronounced correctly, except for the /aɪ/ sound was occasionally replaced by /e/ or a close Mandarin vowel sound. Participants at this level showed a great awareness in terms of words ending with a voiceless “e”, even though their pronunciation still remain slightly Chinese accented. Concerning the consonant sounds, participants at this level displayed a better consciousness with respect to the /θ/ and /ð/ sounds despite several mistakes. The main issue of their pronunciation was related to the stress pattern as syllables in Mandarin are mostly pronounced more prominently than in English, and participants need considerable practice to accustom themselves to phonetic changes when linking the words together as fewer of them were required in Mandarin (Chang, 2001). For example, in the phrase emerged from the participants’ controlled speech, “they should have” should be produced as /’ðiː’ʃʊdəv/ with the /h/ sound naturally omitted and the /æ/ sound smoothly changed. However, the participants pronounced it as /’ðiː’ʃʊd‘hæv/ with each phoneme stressed separately. Overall, great efforts and purposive practices can be identified for this group as they generally overcame specific obstacles influenced by their mother tongue language.

Participant at Level 4 is from Group 2 who has been exposed to English since nursery school. With almost 20 years of exposure to English, he displayed a great performance of English phonological skills. The vast majority of vowel sounds, consonant clusters and diphthongs were correctly produced with a beautiful British accent. Nevertheless, the vowel sound /aɪ/ was replaced once or twice by a close Mandarin sound when it was pronounced at a relatively fast speed, causing confusions between “ret” and “right” in the phrase like “…the right way to learn English…”. Furthermore, the consonant /v/ sound was replaced by a slight /f/ sound in the word “twelve”, therefore leading to /twelf/. The participant demonstrated a great awareness with respect to the words tress issue, the stressed syllables and junctures could be pronounced accurately and smoothly in most cases. Participant’s phonological performance in this category was rated as “advanced”, which is “near native-like” accent as their Chinese accent was barely maintained, except for several specific words in exceptional cases.

The last category consisted of one participant who has been receiving English instructions since Grade 7. The participant pronounced all English sounds correctly and linked the lexical chunks smoothly into a “stream of speech” (Swan and Smith, 2001, p313) with a standard American accent. This participant was rated as “native-like” accent as she could pass her speech off as native speakers.

Concerning the samples excerpted from the read-aloud tasks, despite a slight improvement compared to their spontaneous speech, the six participants were placed at the same category as their phonological performances remained similar to the analysis of their interviews in terms of the type of characteristics. When performing the task, participants at Level 2 and 3 paid closer attention to their pronunciation rather than engaging themselves in the text. Since they were aware of their phonological characteristics, they managed to pronounce every word as accurate as possible, especially for the /θ/ and /ð/ sounds, leading to the loss of intonation of the text (Thomson, 1991). Participants who have a native-like or near native-like accent were remained at the same level as expected, indicating that differences were barely existed between spontaneous and controlled speech for people with an advanced level of pronunciation. Overall, compared to the free speech, participants who were more Chinese-accented displayed a slight but not significant improvement in terms of the pronunciation of the reading task, suggesting that participants would focus more on their phonological performances when there was no need to worry about the content of their speech (Bongaerts, 1995).

4.1.2 Summary of the analysis

On the basis of the results presented above, the study yielded counter-results to the CPH, as out of six participants, the participant with late onset age was designated as "native-like" accent. Additionally, no significant differences were identified between early starters and late ones, as most of them were generally placed at the same level (Level 2 and 3) in terms of their pronunciation, thus early starters do not attain distinguishably better L2 phonological performance than late starters in an English setting. These findings failed to support Lenneberg's and Scovel's claim that there was a biologically constrained period, and beyond which the acquisition of accentless pronunciation was impossible for post pubertal learners (Lenneberg , 1967; Scovel, 1988).

Findings between early and late starters do not support the existence of any sharp declines in terms of their pronunciation, as most of the participants – four out of six – were equally placed in Level 2 and 3. Age advantages were however displayed in terms of the overall performance of the participants. Concerning the early starters, one participant was rated as "near native-like" and the other two were considered "slight accented". However, in Group 1, apart from one exceptional case who was defined as "native-like" accent, two subjects with a late starting age were perceived "slight accented" and "noticeable accented" respectively. Thus from this perspective, age effects seem to favour early starters than late ones as three participants with an early starting age demonstrated a generally better performance concerning their overall level, suggesting that age is indeed an essential variable for L2 phonological acquisition.

Overall, in the light of the findings from this small-scale study, the answer to the first research question cannot be simply interpreted as a complete denial of the biological advantages for younger learners. Rather, as a possible and acceptable explanation for the results, the author would like to argue that the biological disadvantage could be compensated for by different ways, such as considerable exposure and intensive training to the target language (Bongaerts, 1995). Therefore, in consistent with Bongaerts et al. (1995, 1997, 1999), Long (1990), Oyama (1976) and Lamendalla (1977), it would be more appropriate to replace the term "critical period" with "sensitive period", since the latter one indicates a general biological process and the influence of which differs from individuals accordingly (Ioup et al., 1994; Moyer, 1999).

4.2 Potential factors influencing Chinese speakers' pronunciation

The second half of this section will look particularly into the content of the participants' answers emerged from the interviews. As all the participants are highly successful English learners with great cognitive maturity, they could thus share their unique perspectives and views of English, and reflect more on their learning experiences.

As reported by most of the participants, even though their exposure to English was largely limited to a few hours a week at the very beginning of learning English, the amount of English instructions increased gradually ever since high school and once they were at university, they were almost engaged in English with all subjects exclusively taught in English. According to subjects with "near native-like" accents, they also received intensive and professional training in phonetics and vocabulary as a preparation for their IELTS tests. Therefore, considerable training and purposive practices on phonological skills were considered indispensable determiners of successful mastery of accentless speech (Flege and Eefting, 1987).

What's more, participants with an outstanding phonological performance were reported extensive contacts with native speakers during their extended stay in UK, indicating the influence of exposure to target language does seem to be a prerequisite for proficient phonological attainment (Bongaerts et al.,1995). Besides, Muñoz in 2006 highlighted the importance of the learning environment, indicating that the language context in which participants engaged might exert various impacts on their second language learning.

Additionally, judging from the case in Level 2 who was able to pronounce the /θ/ and /ð/ sounds in less-frequent words while failed to produce them correctly in simple words, the type of received instructions does make a difference in terms of L2 pronunciation acquisition (Long, 1983). When receiving the instructions of simple words from the former English teacher, the participants' inaccurate pronunciation could not be distinguished and corrected accordingly, thus resulting in the fact that he was accustomed to the wrong pronunciation which could not be changed easily. However, as he was assigned to a more phonologically-accurate English teacher in high school, and thus receiving correct instructions concerning words with /θ/ or /ð/ sounds, he was then picked up his mistake and managed to produce the correct sound for the new-learnt words purposefully.

Phonological acquisition is intimately bound up with learners' motivations and perspectives towards it (Leather, 2003). In the light of the answers from speaker with a "native-like" accent, her success in phonological acquisition partly attributes to her "constant interest in English-speaking situation comedy and movies" and "the curiosity of different western cultures". Furthermore, as participants are all international students who have been exposed to the English-speaking environment for years, most participants reported an increasing urge of minimising their foreign accents after studying in the UK so as to maximise their personal acceptability to the target language community. (Eisenstein, 1983; Cunninghan-Anderson, 1997;

Leather, 2003). Overall, the findings confirmed Bongaerts' (1995) view that highly motivated learners were more likely to attain a proficient level of pronunciation, and personal interests as well as integrative and intrinsic motivations do account for the acquisition of L2 phonological performance (Ioup, 1990; Smit and Dalton-Puffer, 1997; Leather, 2003).

Furthermore, from the perspective of the participants' pronunciation characteristics, they do share some common mistakes due to the interference of their same L1. For example, it requires intensive practices for almost all participants to distinguish the sound /aɪ/ from its close but not identical Mandarin counterpart. Therefore, the findings from this study seemed to in line with Flege's view that the phonetics patterns of L1 were likely to assimilate the L2 speech and therefore interfering the performance of L2 phonologically, as most of the participants have encountered similar pronunciation problems arose as a result of their L1 interference (Flege, 1997; Flege et al., 1999; Guion et al., 2000; Piske, 2001; Leather, 2003). Moreover, the results did not support what claimed by Flege in 1999 that the L1 filter would increase speakers' foreign accent after childhood, as there was an exceptional case with a late starting age who passed herself for native speakers successfully.

Overall, the findings of the small-scale research contributed some empirical evidences concerning the age influences in degree of maintained foreign accent, along with an investigation on other possible factors influencing Chinese English learners' phonological performance. The following section will mainly review the whole study by briefly summarising the results and highlighting the findings, along with outlining its pedagogical implications and limitations for future study.

5. Conclusion

5.1 Limitations

The present study has a number of limitations stated below. First, it should be noted that although the current study was carried out with an intention of exploring whether age effects determined L2 pronunciation acquisition for Chinese English learners, as well as identifying other possible factors affecting L2 pronunciation, the findings for the study still cannot be simply generalised to wider population due to the nature of qualitative research and the inadequacy of the participants (Popay et al, 1998; Dörnyei, 2007). The interpretation of the data could be more reliable and valid if the scale of the study could be expanded accordingly.

The Hawthorne effect, which refers to the impacts of research procedure on participants' behaviors throughout the study (Cook, 1962), is considered another possible limitation of the research. As the participants were provided with the research outlines and informed of the research aims in advance, they might be more willing to show the positive side of themselves in front of the audio recorder, which might have affected the result of my interpretation of their answers.

Furthermore, as the author is a Mandarin speaker who learns English as a second language, her analysis of the participants' phonological performance might thus be influenced. According to Scovel (1981) and Flege (1984), inexperienced native speakers without noticeable regional accent were considered the ideal judges concerning the phonological assessment. Furthermore, according to Marinova-Todd and his colleagues, non-native speakers could also be rated as natives in different positions outside the host place (Marinova-Todd et al., 2000), which to some extent might also hinder the evaluation as the author was the only judge of the assessment.

5.2 Implications

From what have been discussed above, this small-scale study threw light on the related research topics as well as provided some pedagogical implications below.

The findings revealed that intensive exposure and purposive training on phonetics could significantly affect speakers' pronunciation. Phonological performance has never been attached much importance on the English class in China, most teachers pay closer attention to the acquisition of syntactic skills and writing compositions as to help students meet the requirements for exams and tests effectively. However, phonetic-related training should be included in the school curriculums, supportive teachers should be selected to conduct various activities concerning speech learning (Marinova-Todd et al., 2000), since it benefits the students by enhancing their phonological skills as well as encouraging them to develop a positive attitude towards L2 pronunciation acquisition. Sufficient amount of pronunciation tutorials and appropriate instructions correlated with lower learning anxiety and higher levels of English pronunciation (Smit and Dalton-Puffer, 1997).

As most of the studies related to age effects and phonological attainments were based on languages which are typologically close to English (Asher and García, 1969; Evrin-Tripp, 1974; Flege and Eefting, 1987; Bongearts et al., 1995). However, Mandarin shares a completely different language system from its phonology patterns to its writing forms. Therefore, in the light of the findings and results discussed above, the current study contributes some valuable empirical evidences for future studies both in SLA and phonology fields.

Finally, this study contributes to my future career as an English teacher, since it enables me to realise the importance

of motivating and encouraging my students during the English learning process. Apart from giving proper and correct instructions to improve their speech accuracy, I will also focus on establishing a supportive teacher-student relationship to improve their motivations and willingness of learning English.

5.3 Summary of the current study

This comparative study was carried out to explore the influence of onset age on Chinese English speakers' phonological proficiencies, along with an investigation on other potential factors that affects L2 pronunciation acquisition. The research disconfirmed CPH by suggesting that there were no significant differences between early starters' and late starters' phonological attainments, and it was possible for older learners to "pass themselves off as native speakers phonologically" (Scovel, 1988, p185).

Furthermore, judging from the overall performance of participants, the results could not be simply interpreted as a complete denial of the common view that "younger is better", as the participants with early starting age displayed a slight better overall performance in the assessment. Therefore, it would be more appropriate to perceive the starting age as a sensitive rather than critical variable for L2 phonological learning (Oyama, 1976; Long, 1990; Bongaerts et al., 1995).

Besides, in the light of the interview results, factors like high degree of motivations, intensive training, type of L2 instructions, language setting as well as L1 interference are also potential variables for L2 phonological acquisition. Overall, second language acquisition is in fact an individual process which may vary significantly depending on learners' learning experiences (Nott, 1994; Moyer, 2004). In an attempt to fully analyse the influence of age factor and other potential variables on the degrees of maintained foreign accent, more related longitudinal research need to be carried out to record the impacts of these factors on learners over time for further investigation.

References

[1] Asher, J. and Price, B. (1967) The learning strategy and the total physical response: some age differences. *Child Development*, 38(4), pp. 1219-1227.

[2] Birdsong, D. (1992) Ultimate Attainment in Second Language Acquisition. *Language*, 68 (4), pp. 706-755.

[3] Bongaerts, T. (1999) Ultimate Attainment in L2 Pronunciation: The Case of Very Advanced Late L2 Leaners. In D. Birdsong (Ed.), *Second Language Acquisition and the Critical Period Hypothesis*. pp. 133-159. London: Lawrence Erlbaum Associates Inc.

[4] Bongaerts, T., Planken, B. and Schils, E. (1995) Can Late Starters Attain a Native Accent in a Foreign Language? A Test of the Critical Period Hypothesis. In D. Singleton and Z. Lengyel (Eds.), *The Age Factor in Second Language Acquisition*. pp. 30-50. Clevedon: Multilingual Matters Ltd.

[5] Bongaerts, T., Summeren, C., Planken, B. and Schils, E. (1997) Age and Ultimate Attainment in the Pronunciation of a Foreign Language. *Studies in Second Language Acquisition*, 19 (4), pp. 447-465.

[6] Breathnach, C (1993) Temporal determinants of language acquisition and bilingualism. *Irish Journal of Psychological Medicine*, 10(1), pp. 41-47

[7] British Educational Research Association (BERA) (2011) Ethical Guidelines for Educational Research. London, BERA.

[8] British Parliament (1998) *Data Protection Act of 1998*. London: Stationary Office.

[9] Burstall, C. (1975). Factors affecting foreign-language learning: a consideration of some recent research findings. *Language Teaching*, 8(1), 5-25.

[10] Chang, J. (2001) Chinese Speakers. In M. Swan and Smith and B. Smith, *Learner English*. pp. 310-324. Cambridge: Cambridge University Press

[11] Chinese Ministry of Education. (2001). The Ministry of Education guidelines for vigorously promoting the teaching of English in primary schools. [online] Available at: http://www.edu.cn/20010907/3000637.shtml

[12] Cohen, L., Manion, L., and Morrison, K. (2011) *Research Methods in Education*. London: Routledge.

[13] Cook, D. L. (1962) The Hawthorne Effect in Educational Research. *The Phi Delta Kappan*, 44 (3), pp.116–122.

[14] Cook, V. (1995) Multicompetence and effects of age. In D. Singleton and Z. Lengyel (Eds.), *The Age Factor in Second Language Acquisition*. pp. 52-66. Clevedon: Multilingual Matters.

[15] Cummins, J. (1980) The cross-lingual dimensions of language proficiency: Implications for bilingual education and the optimal age issue. *TESOL Quarterly*, 14(2), pp.175-187.

[16] Cummins, J. (1981) Age on arrival and immigrant second language learning in Canada. A reassessment. *Applied Linguistics*, 11 (2), pp. 132-149.

[17] Cummins, J. and Swain, M. (1986) *Bilingualism in Education*. London: Longman.

[18] Cunningham-Andersson, U. (1997) Native speaker reactions to non-native speech. Second-Language Speech. *Structure*

and Process. pp. 133-144. New York: Mouton de Gruyter.
[19] Cunningham, S. and Moor, P. (2007) *New Cutting Edge: Intermediate*. London: Pearson Longman.
[20] Davies, M. and Hughes, N. (2014) *Doing a Successful Research Project*. Basingstoke: Macmillan Publishers Ltd.
[21] DeKeyser, R. (2012) Age effects in second language learning. In S. M. Gass and A. Mackey (Eds.), *The Routledge Handbook of Second Language Acquisition*. pp. 442-460. Oxon: Routledge.
[22] DiCicco-Bloom, B and Crabtree (2006) The qualitative research interview. *Medical education*, 40(4), pp.314-321.
[23] Dickerson, L. J. and Dickerson, W.B (1977) Interlanguage phonology: Current research and future directions. In S.P. Corder and E. Roulet (Eds.) *The Notions of Simplification, Interlanguage and Pidgins and their Relation to Second Language Pedagogy*. pp. 18-29. Genève: Librairie Droz.
[24] Dörnyei, Z. (2007) *Research Methods in Applied Linguistics*. Oxford: Oxford University Press.
[25] Dörnyei, Z. and Ushioda, E. (2011) *Teaching and Researching Motivation*. Harlow: Pearson Education Limited.
[26] Eisenstein, M. (1983) Native Reactions to Non-native Speech: A review of empirical research. *Studies in Second Language*, 5, pp. 160-176.
[27] Eksrtand, L.H. (1976) Age and length of residence as variables related to the adjustments of migrant children, with special reference to second language learning. In G. Nickel (Ed.) *Proceedings of the fourth International Congress of Applied Linguistics*. Stuttgart Hochshul.
[28] Ellis, R. (1994) *The Study of Second Language Acquisition*. Oxford: Oxford University Press.
[29] Ervin-Tripp, S.M. (1974) Is second language learning like the first? *TESOL Quarterly*, 8(2), pp. 111-127.
[30] Fathman, A. (1975) The relationship between age and second language productive ability. *Language Learning*, 25, pp. 245–253.
[31] Flege, J. E., and Eefting, W. (1987) Cross-language switching in stop consonant perception and production by Dutch speakers of English. *Speech Communication*, 6(3), pp. 185-202.
[32] Flege, J. E., Birdsong, D., Bialystok, E., Mack, M., Sung, H. and Tsukada, K. (2006) Degree of foreign accent in English sentences produced by Korean children and adults. *Journal of Phonetics*, 34, pp.153-175.
[33] Flege, J. E., Frieda, E. M. and Nozawa, T. (1997) Amount of native-language (L1) use affects the pronunciation of an L2. *Journal of Phonetics*, 25, pp.169-186.
[34] Flege, J. E., Yeni-Komshian, G. H. and Liu, S. (1999) Age Constraints on Second-Language Acquisition. *Journal of Phonetics*, 25, pp 169-186.
[35] Flege, J.E. (1984) The detection of French accent by American listener. *Journal of the Acoustical Society of America*, 76, pp. 692-707.
[36] Fullana, N. (2006) The development of English (FL) perception and production skills: starting age and exposure effects. In Munõz, Carmen (Eds.), *Age and the rate of foreign language learning*. pp. 41-64. Clevedon: Multilingual Matters.
[37] Gillette, G. (1994) *On speaking terms: Practical guide to pronunciation for ABLE/ESL Teachers*. Washington DC: Office of Education Research and Improvement.
[38] Grinder, R., Otomo, A. and Toyota, W. (1962) Comparisons between second, third and fourth grade children in the audio-lingual learning of Japanese as a second language. *The Journal of Educational Research*, 56(4), pp. 463- 469.
[39] Grosjean, F. (1992) *Life with two languages*. Cambridge, MA: Harvard University Press.
[40] Guion, S.G., Flege, J.E. and Loftin, J.D. (2000) The effect of L1 use on pronunciation in Quichua-Spanish bilinguals. *Journal of Phonetics*, 28. pp. 27-42.
[41] Hahn, W. K. (1987) Cerebral lateralization of function: From infancy through childhood. *Psychological Bulletin*, 101, pp. 376-392.
[42] Harrell, M. C., Bradley, M. A. (2009) *Data Collection Methods: Semi-Structured Interviews and Focus Groups*. California.
[43] Harrell, M. C., Bradley, M. A. (2009), *Data Collection Methods: Semi-Structured Interviews and Focus Groups*. RAND, California.
[44] Harris, R. (1992) Cognitive Processing in Bilinguals. Amsterdam: Elsevier.
[45] Hyltenstam, K. (1992) Non-native features of near-native speakers: On the ultimate attainment of childhood L2 learners. In R.Harris (Ed.) *Cognitive Processing in Bilinguals*. pp. 351-368. Amsterdam: Elsevier.
[46] Hyltenstam, K., and Abrahamsson, N. (2000). Who can become native‐like in a second language? All, some, or none? On the maturational constraints controversy in second language acquisition. *Studia linguistica*, 54(2), pp. 150-166.
[47] Ioup, G., Boustagui, E., Tigi, M. and Moselle, M. (1994) Reexamining the critical period hypothesis: A case of successful adult SLA in a naturalistic environment. *Studies in Second Language Acquisition*, 16, pp.73-98.
[48] García Lecumberri, M. L., and Gallardo, F. (2003) English FL sounds in school learners of different ages. In M. P. García Mayo and M. L. García Lecumberri (Eds.), *Age and the acquisition of English as a foreign language*. pp. 115-135.
[49] Jia, G. and Aaronson, D. (1999) Age differences in second language acquisition: The Dominant Language and Maintainence Hypothesis. *Proceeding of the Boston University Conference on Language Development*, 23, pp. 301-312.

[50] Jia, G., Strange, W., Wu, Y., Collado, J., and Guan, Q. (2006) Perception and production of English vowels by Mandarin speakers: age-related differences vary with amount of L2 exposure. *Journal of the Acoustical Society of America*, 119, pp. 1118-1130.
[51] Johnson, J. and Newport, E. (1989) Critical period effects in second language learning: The influence of maturational state on the acquisition of ESL. *Cognitive Psychology*, 21, pp. 60-99
[52] Klein, W. (1986) *Second Language Acquisition*. Cambridge: Cambridge University Press.
[53] Krashen, S., Long, M. and Scarcella, R. (1979) Age, *Rate and Eventual Attainment in Second Language Acquisition. TESOL Quarterly*, 13 (4), pp 573-582.
[54] Kvale, S. (1996) Interviews: An Introduction to Qualitative Research Interviewing. Thousand Oaks CA: Sage.
[55] Larsen-Freeman, D. and Long, M.H. (1991) *An introduction to second language acquisition research*. Harlow: Longman.
[56] Leather, J. (2003) Phonological acquisition in multilingualism. In M. P. García Mayo and M. L. García Lecumberri (Eds.), *Age and the acquisition of English as a foreign language*. pp. 23-58. Clevedon: Multilingual Matters LTD.
[57] Lenneberg, E. H. (1967) *Biological Foundations of Language*. New York: Wiley.
Long, M. H. (1990) Maturational Constraints on Language Development. *Studies in Second Language Acquisition*, 12 (3), pp 251-285.
[58] Mackey, A. and Gass, S. (2005) Introduction to research. *In Second Language Research*. pp.1-23. London: Lawrence Erlbaum Associates.
[59] Major, R. C. (1987) A model of interlanguage phonology. In G.L. Ioup and S.H. Weinberger (Eds.) *Interlanguage Phonology: The Acquisition of a Second Language Sound System*. pp. 101-124. New York: Newbury House.
[60] Major, R. C. (1990) L2 Acquisition, L1 loss, and the critical period hypothesis. In J. Leather and A.R. James (Eds.) *New Sounds 90*, pp. 14-25. Amsterdam: University of Amsterdam.
[61] Marinova-Todd, S. H., Marshall, D. B. and Snow, C. E. (2000) Three misconceptions about age and L2 learning. *TESOL Quarterly*, 34, pp. 9-34.
[62] Marzi, C. A. (1996) Lateralization. In J. G. Beaumont, P. M. Keneally, and M. J. C. Rogers (Eds.), *The Blackwell dictionary of neuropsychology*. pp. 437-443. Oxford: Blackwell.
[63] Mayberry, R., Fischer, S. and Hatfield, N. (1983) Sentence Repetition in American Sign Language. In J. Kyle and B. Woll (Eds.), *Language in Sign: International Perspectives on Sign Language*. pp. 83-97. London: Croom Helm.
[64] McNiff, J., Lomax, P. and Whitehead, J. (1996) *You and Your Action Research Project*. London: Routledge.
[65] Moyer, A. (1999) Ultimate attainment in L2 phonology: The critical factors of age, motivation and instruction. *Studies in Second Language Acquisition*, 21, pp. 81-108.
[66] Moyer, A. (2004) Age, *Accent and Experience in Second Language Acquisition*. Clevedon, Multilingual Matters Ltd.
[67] Muñoz, C. (2003) Variation in Oral Skills Development and Age of Onset. In M. García Mayo and M. L. García Lecumberri (Eds.), *Age and the Acquisition of English as a Foreign Language*. pp. 161-181. Clevedon: Multilingual Matters Ltd.
[68] Muñoz, C. (2006) *Age and the Rate of Foreign Language Learning*. Clevedon, Multilingual Matters Ltd.
[69] Neufeld, G. and Schneiderman, E. (1980) Prosodic and articulatory features in adult language learning. In R. Scarcella and S. Krashen (Eds.), *Research in Second Language Acquisition*. pp. 105-109. Rowley, MA: Newbury House.
[70] Nott, D. (1994) Pronunciation: Does it matter? *Francophonie*, 9, pp. 2-17.
[71] Olson, L. L., and Jay Samuels, S. (1973) The relationship between age and accuracy of foreign language pronunciation. *The Journal of Educational Research*, 66(6), pp. 263-268.
[72] Ortega, L. (2009) *Understanding Second Language Acquisition*. Oxon, Routledge.
[73] Oyama, S. (1976) A sensitive period for the acquisition of a nonnative phonological system. *Journal of Psycholinguistic Research*, 5, pp. 261-283.
[74] Patkowski, M. (1990) Age and accent in a second language: A reply to James Emil Flege. *Applied Linguistics*, 11, pp. 73-89.
[75] Pennington, M.C. (1998) The teachability of phonology in adulthood: A re-examination. *International Review of Applied Linguistics*, 36 (4), pp. 323–341.
[76] Piske, T. and Mackey, I.R.A and Flege, J.E. (2001) Age and the L1 use effects on degree of foreign accent in English. In J.J. Ohala, Y.Hasegawa, M. Ohala, D. Granville and A.C. Bailey (eds.) *Proceeding of the 14th international Congree of Phonetic Sciences*. pp.1433-1436. Berkeley: University of California.
[77] Popay, J., Rogers, A. and Williams, G. (1998) Rationale and standards for the systematic review of qualitative literature in health services research. *Qualitative health research*, 8(3), pp.341-351.
[78] Rajib, M.S. and Mou, N.Z. (2014) Ethical Issues of Qualitative Research. In J. Wang (Ed.), *Encyclopedia of Business Analytics and Optimization*. pp. 852-863. Hershey, PA: Business Science Reference.
[79] Scarcella, R. and Oxford, R. L. (1994) Second language pronunciation: state of the art in instruction. *System*, 22 (2), pp. 221-230.

[80] Scovel, T. (1981) The recognition of foreign accents in English and its implication for psycholinguistic theories of language acquisition. In J.-G.,SAVARD and I., LAFORGE(Eds.) *Proceeding of the 5th Congress of L'Association International de Linguistique Appliquée*. pp.389-401. Québec: Les Presses de L'Université Lavel.
[81] Scovel, T. (1988) *A time to speak: a psycholinguistic inquiry into the critical period for human speech*. Rowley, MA: Newbury House.
[82] Seliger, H. W. (1978) Implications of a multiple critical periods hypothesis for second language learning. In W. Ritchie (Ed.), *Second language acquisition research*. pp. 11-19. New York: Academic.
[83] Singleton and Z. Lengyel (1995), *The Age Factor in Second Language Acquisition*. Clevedon: Multilingual Matters.
[84] Singleton, D. (2001) Age and Second Language Acquisition. *Annual Review of Applied Linguistics*, 21, pp. 77-89.
[85] Singleton, D. (2003) Critical Period or General Age Factor(s)? In M. García Mayo and M. L. García Lecumberri (Eds.), *Age and the Acquisition of English as a Foreign Language*. pp. 3-22. Clevedon: Multilingual Matters Ltd.
[86] Slavoff, G. R. and Johnson, J.S. (1995) The effects of age on the rate of learning a second language. *Studies in Second Language Acquisition*, 17 (1), pp. 1–16.
[87] Smit, U. and Dalton-Puffer, C. (1997) EFL pronunciation learning and motivation research. In J. Leather and A. James (Eds.) *New Sounds 97: Proceeding of the Third International Symposium on the Acquisition of Second-Language Speech*. pp. 321-330. Klagenfurt: University of Klagenfurt.
[88] Snow, C. and Hoefnagel-Höhle, M., (1978) Age differences in second language acquisition. In E., Hatch (ed.) *Second Language Acquisition: A Book of Readings*. pp. 333–344. Rowley, MA: Newbury Press.
[89] Snow, C. E. and Hoefnagel-Höhle, M. (1977) Age differences in the pronunciation of foreign sounds. *Language and Speech*, 20, pp. 357-365.
[90] Snow, C. E. and Hoefnagel-Höhle, M. (1978) The Critical Period for Language Acquisition: Evidence from Second Language Learning. *Child Development*, 49, pp. 1114-1128.
[91] Swan and Smith, M. and Smith, B. (2001) *Learner English: A teacher's guide to interference and other problems*. Cambridge: Cambridge University Press
[92] Tarone, E. (1979) Interlanguage as chameleon. *Language Learning*, 29, pp. 181-191.
[93] Tarone, E. (1987) The phonology of interlanguage. In G. Ioup and S. Weinberger (Eds.), *Interlanguage Phonology*. pp. 70-85. Cambridge, MA: Newbury House.
[94] Tarone, E. (1988) Variation in Interlanguage. London: Edward Arnold.
[95] Thomas, G. (2013) How to do your research project. London: SAGE Publications Ltd.
[96] Thomson, I. (1991) Foreign accents revisited: The English pronunciation of Russian immigrants. *Language Learning, 41*, pp. 177-204.
[97] Asher, J. and García, R. (1969) The optimal age to learn a foreign language. *Modern Language Journal*, 53, pp. 334–341.
[98] Tsukada, K., Birdsong, D., Bialystok, E., Mack, M.., Sung, H., and James, F. (2005) A developmental study of English vowel production and perception by native Korean adults and children. *Journal of Phonetics*, 33, pp. 264-267.
[99] Walsh, T.M. and Diller, K.C. (1979) Neurolinguistic Considerations on the Optimum Age for Second Language Learning. In K.C. Diller (Ed.) *Individual Differences and Universals in Language Learning Aptitude*. pp. 3-21. Rowley, MA: Newbury House
[100] Wang, Q. (2008) Perception of English stress by Mandarin Chinese learners of English: An acoustic study. Doctoral dissertation, University of Victoria.
[101] Yeni-Komshian, G., Flege, J.E. and Liu, H. (1997) Pronunciation Proficiency in L1 and L2 among Korean-English bilinguals: The effects of age of arrival in the US. *Journal of the Acoustical Society of America*, 92, S102A.
[102] Penfield, W. and Roberts, L. (1959) Speech and brain mechanisms. Princeton, NJ: Princeton University Press.