

HPEN7006

Current Theories of Second Language Acquisition

Assignment 2: Essay

**Fundamental Conceptual Issues in Critical Period
Hypothesis and what they tell us about the second
language teaching to people of different age**

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Abstract:

Critical Period Hypothesis (CPH) concerns whether there is a best age to learn a language, and there are lots of debate when it applies to second language acquisition (SLA). After reviewing its theoretical development and definition, the essay raises three fundamental conceptual questions: 1) Does the CP exists? 2) How to evaluate L2 competence? And 3) How does age affect L2 learning? In attempting to answer these questions, the essay argues that CPH is a very complex concept, and the controversy in whether we can fundamentally accept or reject CPH lies in lacking of consistent and unified standard. This essay takes a stand of the weak version of CPH, and accept that there is a sensitive period (SP) in L2 learning, and such effect differs in different L2 aspects. Moreover, age is not the only variable influencing L2 learning, but many crucial factors interwoven together, affecting SLA through physical, cognitive, psychological, sociological mechanisms and learning context. At the last part, teaching implications brought by CPH will be discussed.

Introduction

The role of age factor in second language (L2) acquisition (SLA) has been a hot debate for some decades, and it seems to be a common belief that children are usually more successful in L2 learning than adults, which then leads to an interesting research question – whether there is a certain optimal age for SLA? The theory for such age period is called ‘Critical Period Hypothesis’ (CPH). It is of great significance to explore this concept, because it not only provides theoretical foundation for understanding how and to what extent age affects SLA, but also offers practical implications to parents, teachers and educational policy makers.

Theoretical development

The earliest version of CPH was proposed by Penfield and Roberts (1959). On their

analysis of different recovery rate in brain hemisphere and speech function between kids and grown-ups, they argue that there exists a critical period (CP) for language learning, this is because human brain will become stiff in its language learning part after age of 9, making language acquisition extremely difficult afterwards “because it is unphysiological” (p.255). To further popularise CPH, Lenneberg (1967) demonstrates more neurological evidence and argues that the CP lasting from age 2 to puberty during which children can acquire the language innately and effortlessly, and beyond which the ‘language-learning-blocks’ (p.176) would grow rapidly. He also extends this CP concept from L1 to L2, by discovering the inevitable foreign accent if learning L2 after puberty.

This theory later has been examined, challenged and developed by a great number of scholars, raising lots of the debate on various aspects. To be specific, the mainstream research during the first two decades after the term firstly being proposed was about whether such CP really exists, and many empirical studies tried to prove or disprove this hypothesis by looking at whether children perform better in L2 learning than adults (e.g., Olson & Samuels, 1973; Snow & Hoefnagel-Höhle, 1978; Cochrane & Sachs, 1979, etc.). Around 1980s, the focus took a turn to defining the onset and offset age of CP (e.g., Diller, 1981; Scovel, 1988, etc.), especially the relation between the onset age and children’s long-term advantage. In recent three decades, scholars are more interested in the level of language competence – whether the late L2 learners can reach native-like proficiency (e.g., Long, 1990; Hylltenstam & Abrahamsson, 2003, etc.).

Definition and fundamental conceptual questions

From the above overview, we know that CPH is a very complex and controversial issue. Generally, CPH in L2 can be defined as a certain period of time during which the second language can be acquired implicitly and easily and reach native-like competence, whereas after which this process becomes much more laborious and difficult (Ellis,

2015, p.37). However, in its definition, there remains three most fundamental conceptual questions.



First and foremost, CPH claims a certain period in age (see the left side of the arrow), but the fundamental question is whether such period really exists, and if yes, when exactly it is and how it looks like? – whether it is a sharp and total block or a gradual decline?

The second question is about the right side of the arrow – we say more success in L2 leaning or even nativelikeness, but what would be the standard of success? Some may say the rate of learning while others stress on ultimate attainment, and there are also plenty of discussions in terms of different key modules of language such as pronunciation, syntax and grammar.

Last but not least, the arrow represents the ways in which age affect SLA. Such affecting mechanisms go beyond the mere neurology as indicated in the early evidence and extend to psychological, sociological and other factors.

Fundamental conceptual questions of Critical Period Hypothesis



Q1: Does this CP exist?

- When exactly is this CP?
- How does it looks like?

Q3: How does age affect L2 learning?

Q2: How to evaluate the L2 competence?

Part 1: Does this critical period really exist?

After the term of CPH being proposed, scholars in favour of this concept put forward evidence of children such as Genie who were tragically deprived from the access to language in childhood and would never be able to acquire a language at full competence after she was found at 13 (Curtiss, 1977). Her incomplete language ability is attributed by Curtiss to the fact of her passing the crucial age of language acquisition, proving the existence of such CP.

When exactly is this critical period?

When this term later being applied to L2 learning, while many scholars tend to agree that age is a very crucial factor, they do not have clear consensus on exactly when this CP is and whether there is a well-defined and predictable terminus. Penfield and Roberts (1959) states that CP ends at 9, whereas Lenneberg (1967) believes it from 2 years old to puberty. With deeper drills, later studies group the age into more specific phases. For example, in Johnson & Newport's (1989) research, the English level of 46 native Chinese or Korean speakers who had immigrated to the U.S.A between 3 to 26 years was tested using a grammaticality judgement task. From their experiments, they conclude that the phase I of CP is before seven years old, during which learners are able to achieve native level, and the phase II is between seven years old to puberty as there will be a linear decline in L2 abilities, and once beyond puberty, learners' performance will generally be much worse.

To continue to build on the CP segmentation, other scholars separate CP into different phases according to specific aspects of L2. For example, in addition to the agreement on phase I – before 7 – with Johnson & Newport's (1989) research result, Long (1990) adds another two ending points for learning phonetics and morphosyntax respectively: the former is age 12 and the latter is age 15. Similarly, Ruben (1997) states that phonetics acquisition even starts from foetal stage and the offset points for acquiring

pronunciation, syntax and semantics are age 1, age 4 and age 15 respectively.

By and large, despite some disputes, the CP is generally believed to last from birth to puberty, with the early 7 years are usually believed to be more significant. Meanwhile, the CP termini may vary in terms of different learning modules of L2, in which phonetics/phonology often has the shortest window period in relatively younger age.

How CP termini looks like?

While looking at when the CP termini is, linguists are also interested in what will happen after reaching that termini? Will it be a sharp discontinuity, meaning once after that offset point, there will be a total block and sudden disappear in the natural acquiring ability, irrespective of whether passing that timepoint for one year or one decade (Ellis, p. 38). Or will it be a gradual degradation in learning ability as children growing up, that is to say, even after the offset point, there will still be implicit language learning abilities, but with declined learning efficiency due to the “progressive inefficiency of the organism, or a gradual declining effectiveness of the peripheral input” (Eubank and Gregg, 1999, p.68). The former is a strong version of CPH as it stresses an all-or-nothing dichotomy model of CP termini, so people are either in or out of that “window of opportunity” (Hyltenstam & Abrahamsson, 2003, p. 556) and there is nowhere in between. The latter is regarded as a weak version of CPH, or referred as the term “Sensitive Period Hypothesis” (SPH) (Oyama, 1978; Patkowski, 1980; Long, 1990, p. 252; Harley and Wang, 1997, p. 20), suggesting the sensitivity to language won’t totally disappear on a certain timepoint, but instead, decline gradually from the late childhood to the end of puberty.

One theoretical explanation of CPH is the level of accessibility to the Universal Grammar (UG), a milestone concept in SLA proposed by Chomsky (1965). According to him, the language acquisition device (LAD) embedded in the UG – knowledge of

common grammatical rules and linguistic universals of every language – equips children with an inherent and incredibly efficient capacity for language learning that is distinct from other cognitive approaches. The debate between strong version of CPH and SPH also lies in whether people can still have the full access to UG after reaching the ending timepoint of CP. For example, some nativists (e.g., Schachter, 1988; cf. the discussion in Singleton 2005, p.274) claim that post-pubertal L2 learning has absolutely no access to UG and such learning is mainly through general problem-solving skills, whereas others, Hawkins (2001, p.358) for example, believe that only some particular components of UG will be constrained by maturation and therefore maintaining partly access to UG, explaining the logic of age-related declining rather than a sudden discontinuity behind SPH.

Though supported by some scholars such as Johnson and Newport (1989), the strong version of CPH has been frequently criticised because it's too absolute. Bialystok and Hakuta (1999) re-analysed Johnson & Newport's data and found no evidence of a clear-cut discontinuity. Also, Birdsong (2006) disproves the dichotomy idea too by analysing the data from a wide range of researches and thereby claiming that the age effect shows indefinite pattern across the surveyed time span and is continuous in nature.

Opinions against the existence of CPH

One common way to disprove the existence of CPH is to find counter-cases showing late L2 learners can still reach high level of language competence or even nativelikeness. Joseph Conrad, a famous writer that born in Poland but had many master pieces written in English – his second language learned after his 30s, can be a very good example. But there are three points need to be taken into consideration. Firstly, while such counter-cases stand against, to some extent, the strong version of CPH, they don't (and can't) disprove the weak version of CPH, or SPH. Secondly, homogeneity or data distribution matters too. In many empirical studies (Patkowski, 1980), it is often the case that the

homogeneity of pre-puberty learners is very high, meaning the success of L2 learning in young age is almost inevitable, but to the contrary, there is always a wide distribution of language proficiency levels achieved among post-puberty learners, demonstrating low possibility of achieving L2 native-like mastery after CP. So, this contrast of possibility is in itself, to some extent, a manifestation of the general trend of CPH. Thirdly, in viewing the exceptional learners, we also need to take account their learning context and mechanisms. For example, according to DeKeyser (2000), the exceptional late learners attain their success through explicit mechanism, but not implicit mechanism which also declined as stated in CPH, so from this perspective, CPH cannot be disproved by simply presenting counter-cases since children and adults are learning through different approaches (this point will be further illustrated later).

Another way of trying to reject CPH is to attribute the study results to important factors other than age. For instance, Rymer (1993) refutes this idea of aforementioned Genie's case by arguing that Genie's difficulty in later language learning is resulted from the emotional trauma that she experienced in the isolation in childhood instead of age. However, as many affecting factors including age are inextricably linked together, it's almost impossible to separate the effects of different factors, so in SLA, it is unfair to either say age is the only decisive factor or say it has nothing to do with age at all.

To sum up, the controversy of whether we can accept or reject CPH lies in lacking of consistent and unified standard of CPH, as challenged by Singleton (2001), the issue of whether CPH is defined as an "absolutely inviolate law" or "a broad tendency" remains unsolved, making it hard for scholars to argue on the same platform. As far as this essay is concerned, CPH is more like a broad and general trend, so the weak version of CPH, or SPH can be acceptable. This is also because as nowadays SLA research has emerged into an enormously rich subject that covers linguistics, sociology, psychology, education and other aspects (Cook, 2008, p.6), age is no longer only about the brain

changes as the earliest CPH articles explain, but many crucial affecting factors interwoven together.

Part 2: How to evaluate L2 performance?

Compare different language learning modules

As it is known that the development in different aspects of L2, phonetics, morphology or syntax for example, associate with different parts of the brain tissue or “neuromuscular basis” (Scovel, 1988. p.101) and relate to different learning skills, age effects can differ too, so it is necessary to examine CPH in terms of different linguistic aspects.

1. Phonetics/Pronunciation

Most studies of the relations between age and L2 development have focused on phonetics/pronunciation, and a general observation is that a noticeable foreign accent is almost inevitable in the cases of older learners whereas young children are much easier and more likely to acquire nativelike pronunciation. Oyama (1976) conducted pronunciation tests on the Italian immigrants who were aged from 6 to 20 and had been living in the USA for 5 to 18 years, and Oyama found out that those who moved to the USA before age of 12 had more natural American accent. Similarly, argued by Asher & Garcia (1969), the best age for Cuba immigrants to move to USA in terms of acquiring authentic American English pronunciation is under age of 6, and such age advantage in acquiring pronunciation will lose after 13. Ruben (1997), as discussed in the Part 1, even believes the phonetics acquisition starts around 6 months in foetal stage and ends around one year old, which is a quite early and short window period.

Although there is no consensus on the specific ending time of pronunciation CP, linguists tend to believe that age is especially relevant to children’s phonetical

development, even those who reject CPH generally concede that some innate special facility for acquiring native pronunciation may vanish after a certain age (Braine, 1971), and they agree that CP for pronunciation only appears at very early age.

2. Language aspects other than pronunciation

As for other linguistic features, such as syntax, morphology, will the learning results of them also be affected by age? Patkowski (1980) studied 67 immigrants to the USA, and in order to remove the accent impacts in the spoken English so to examine the factors other than pronunciation, he asked the linguists to judge the interview transcripts, rather than the recorded tapes. As a result, Patkowski found that, age is a very crucial factor in predicting the success of L2 learning and such effects extend beyond pronunciation. This conclusion is agreed by Johnson and Newport (1989), as they found out that their research subjects score higher on grammatical judgement task if they immigrant to the USA at an early age. However, the age effects on grammar and syntax are not as strong and irreplaceable as on pronunciation. Argued by Birdsong (1992), there seems no significant difference in grammatical use, suggesting at least some learners who begin L2 learning in adulthood can still manage to reach the native-like level in grammar competence.

When compare the CP offset point between pronunciation and other linguistic aspects, we see the termini for former is much earlier. Suggested by Granena and Long (2012), the CP of L2 phonology acquisition closes at first at around age 4, followed by the closing time of CP for collocation and lexis, and finally, around puberty, for grammar. The concept that CP varies in different learning modules of L2 then develops into the hypothesis of *Multiple Critical Period* (Seliger, 1978).

Initial rate VS. ultimate attainment

On this point, the result seems generally clear: adults score higher in initial learning

rate (Krashen, Long & Scarcella, 1979; Muñoz, 2006) but children will keep active in the acquisition for a longer time and will eventually surpass adult in ultimate attainment, perhaps in about 1 year (Snow & Hoefnagel-Höhle, 1978). If we chart the learning progress, adults will show some form of “arrested development” (DeKeyser, 2013) at a lower level, whereas children will start slower but keep going to the point where near or even equivalent to native level.

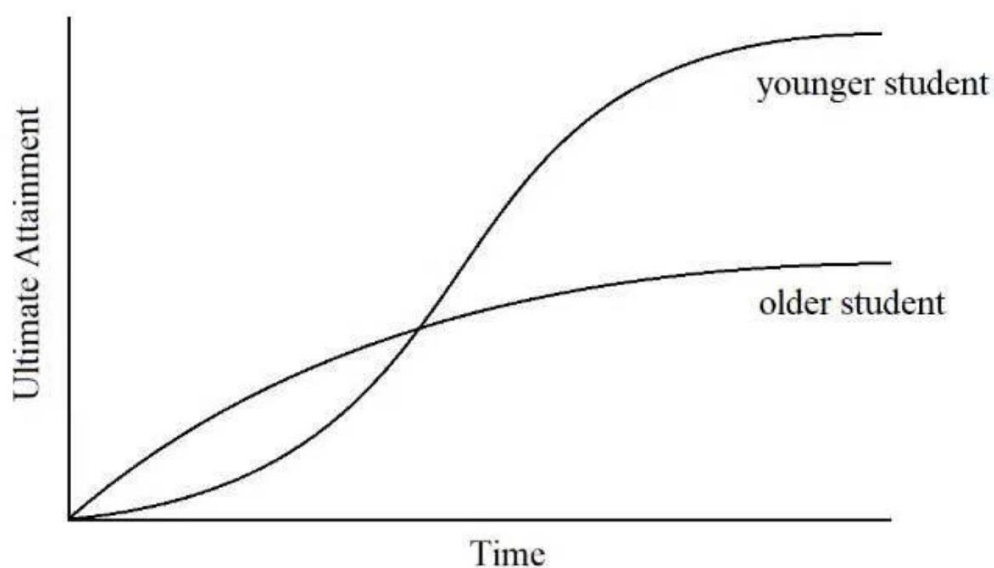


Figure 1: Younger student as opposed to older student in L2 ultimate attainment.

Adapted from Wen (2019)

In recent years, a fierce debate in ultimate attainment is whether it can really reach the native-like proficiency (NLP), especially for those late learners, because the case of native-like late starter concerns our fundamental perception towards CPH. There are three major arguments: 1) only children who start learning L2 at an early age (within the CP) are able to reach NLP (e.g., Johnson & Newport, 1989; Bialystok & Hakuta, 1999); 2) Both early and late starts can manage to reach NLP, but for the latter group, only a very few can achieve that (e.g., Birdsong, 1992). Scholars in favour of it tend to

emphasise that other important factors, motivation and learning methods for example, are also the key to late starters in reaching NLP. 3) Neither early nor late starts can achieve NLP (Flege, 1999), for which they believe there will always remain a gap, large or small, between native speakers and L2 learners.

As debate continues, there are people trying to clarify the evaluation of nativelikeness (Hyltenstam & Abrahamsson, 2000. p. 155), or question the possible bias in data collection and interpretation (DeKeyser, 2013), which needs to be considered in future research.

Part 3: How does age affect SLA?

The third fundamental question concerns the affecting mechanism – in which way does age affect L2 learning? This will be discussed through comparing children and adults in their SLA process.

Physical mechanism

When CPH was proposed at beginning, physical factor which mostly associates with the neurology was where given the most evidence, and relevant research has been developed over the past decades. One important neuro-factor is the lateralisation and there is a debate on its completion point which may lead to different ending point we are discussing in the CPH. For example, Jones-Molfese (1977) suggests that the lateralisation of certain “low level” functions for acquiring phonetics may be completed by the first year after birth while sensorimotor cognitive structures underpin syntax and semantics competence are represented in both hemispheres so their completion will last longer, which demonstrates the neuro differences between children and adults and explains why phonetical CP ends earlier. Other neuro evidence includes amygdala development and myelinisation (Pulvermüller & Schumann, 1994), etc.

Cognitive mechanism

Cognitive mechanism is a tricky one because it adds both advantage and disadvantage to learners of different age. On the one hand, infants or young kids learn their language through working out the relationship between the ostensive meaning which the speaker attempts to convey and the language used, in other words, for infants, meaning is the clue to language, but for adults, it's the other way around – language is the clue to meaning (Macnamara, 1972), because cognitive development allows adults to use more metacognitive way of learning – an ability to think the abstract logic behind the language itself. That's why adult learners are more likely to start faster and perform better in particular language aspects such as grammar (Lightbown & Spada, 2020).

On the other hand, the age-related cognitive decline will negatively affect the language learning process, especially to old and late learners. Proved by many researches (e.g., Nyberg, et al. 2012), the correlation between aging and cognitive decline is notable especially in terms of memory and incremental learning abilities, which will then slow down the language processing speed of adult learners and leads to relatively lower language proficiency.

Psychological factors

As it is said, interest is always the best teacher, this is true to SLA too, regardless how old the learner is. There are two types of motivation: 1) integrative motivation which refers to the purpose of personal development and cultural enrichment, and 2) instrumental motivation which relates to more practical or immediate goals (Gardner & Lambert, 1972), the former of which is often recognised as a stronger ambition in the long run (Yu & Downing, 2012). For young learners, it is usually the integrative motivation, to communicate smoothly and naturally with their peers in L2 community (Snow and Hoefnagel-Höhle, 1978) for example, that spurs their L2 learning, making children easier to keep on learning for a longer time and reach ultimate attainment at a

higher level.

In addition to motivation, other psychological factors such as risk-taking vs. inhibition and anxiety are also likely to be affected by age and therefore leads to difference in SLA between children and adult learners. For example, children are usually more self-centred and less anxious about others' negative evaluation (Dewaele, et al., 2008), making them braver in using L2 and thus improving their L2 proficiency through more practice.

Sociocultural factors

As suggested by Vygotsky and his followers in the Sociocultural theory, language is the primary means of mediation which is organised by cultural artifacts, concepts and activities and is fundamental in facilitating human mental functions (Lantolf, 2000), and therefore language is inseparable with culture and social context and you cannot learn one well without the other. There are four stages in cultural acquisition: 1) initial euphoria, 2) culture shock, 3) gradual recovery, and 4) adaptation and integration, and it will be much easier for children to quickly go through the first three stages and reach the last one and acquire the new culture (Brown, 2014, p.188), whereas adults, with deeper roots in L1 culture, are often struggle with the new cultural identity brought by L2, and therefore making L2 learning harder for adults.

Learning context

One key distinction in the learning context is the approach through which people of different age learn the L2 – children are more in favour of implicit learning while adults utilise more explicit learning (DeKeyser, 2000). To explain it further, implicit learning associates with subconscious and naturalistic acquisition via communication and daily activities. Explicit learning, on the other hand, refers to a conscious process through which L2 knowledge, particularly aspects such as grammar, lexis and syntax, is learnt

in a more formal way such as classroom setting. This pair of concepts has also been stressed by Krashen in his differentiation between “acquiring” and “learning”.

This distinction has been examined and therefore agreed by many scholars. For example, in Muñoz’s study (2006), she observes learners’ progress after different hours of instruction and finds out that post-pubertal learners perform better than early learners in almost all the language features, which, according to her, is attributed to adults’ advantages reflected in their explicit learning approach where their analytical and metalinguistic explanation abilities can exert more positive impacts.

Furthermore, these two different approaches provide another perspective of viewing CPH. Argued by DeKeyser (2000), only the ability of acquiring L2 through implicit approach will be gradually lost when children come to the ending point of CP, but the explicit learning ability will be remained and gradually developed when entering into adulthood, and this offers an explanation to the exceptional case of native-like late learners – they achieve NLP through explicit learning. In other words, the distinction in learning approaches allows us to accept the weak version of CPH while being able to explain the counter-cases.

Conclusion

After reviewing and critically analysing the related literature, we come to know that CPH is a multifaceted, complex and controversial issue. As argued in the essay, the underlying reason for three key fundamental conceptual questions is the lack of a unified answer in whether CPH should be defined as an “absolutely inviolate law” or “a broad tendency”, and therefore the essay calls for a more unified understanding towards the definition of CPH.

As this essay takes a view on the broad tendency, we believe the weak version of CPH or SPH is acceptable, that is to say, there exists a sensitive period, usually from early childhood to puberty, in which children can learn L2 innately and effortlessly mostly through implicit learning and are able to reach a higher or even native-like level in L2 ultimate attainment.

Moreover, while recognising age is a crucial factor in affecting SLA, we cannot over-emphasise the importance of mutual impacts and interrelations among various affecting factors including all sorts of physical, cognitive, psychological, sociocultural factors as well as different learning context, together forming a dynamic matrix for language learning. It is of vital importance to take this point into account when it comes to suggestions to L2 teaching.

Teaching implications

To parents

Children's linguistic ability develops from very early childhood, so the guidance from parents cannot be overlooked. As concluded in this essay, though there remains some debate in CPH for L2 learning, scholars generally agree that to study pronunciation early does make a difference especially in terms of acquiring native accent, that is to say, pronunciation acquisition should be the focus in Children's L2 learning when they are very young. It can through, for example, watching cartoons in L2, making friends with their peers who speak L2, or visiting other family members in L2 speaking country.

Also, patience is significant. As analysed above, children learn language slower at the beginning compared with their older counterparts, and even there will be a 'silent period' (Baker, 2014, p.72) during which children may not speak L2 at all. So, parents need to be patient with children – do not frequently correct children's speaking errors, do not

overstress their scores in language test, etc.

Moreover, parents need to have an appropriate and realistic expectation of children's L2 learning results. "Just to teach earlier" is an easy-to-make illusion, because age is not the only reason, and the actual learning context and other important factors such as the amount of exposure, children's motivation in L2 learning and a delightful learning environment (Baker, 2014) play fundamental roles too. This is particularly relevant to parents in countries where L2 learning becomes a fashionable trend – the so-called bilingual kindergartens or preschools are mushrooming – parents are easily to be overanxious about their children being left behind when almost all of their classmates are rushing to learn L2 in these preschools every day. CP should serve as a guidance to parents, rather than a burden or source of anxiety, otherwise it may lead to children's hatred towards L2 learning as it becomes too competitive and demanding.

To teachers

A good teacher knows how to cater the teaching methods in according with students' aptitude and capability. As discussed earlier, children are more in favour of implicit learning, while explicit or formal learning in classroom setting will be more helpful to adults. Therefore, when to teach young children, teachers can utilise more interactive, communicative naturalist and fan methods, such as Total physical response (TPR), audiolingual approach and communicative language teaching (CLT), whereas to older or adult learners who have more metalinguistic knowledge and organisational skills, suggested methods include task-based language teaching, text-based instruction, translanguaging and etc, and it will be easier for adult-learners to learn the parts that require more analytical skills such as grammar rules.

Other major different characteristics between young and old learners also need to be taken into account. For example, old learners are more shy and inhibited, so instead of

forcing them to quickly speak in L2, teachers can continuously encourage them and allow them to have more time to think, discuss, and organise their words in L2.

To educational policy makers

One important question in setting up educational policies concerns the best age to introduce instruction in another language in school system. Some countries have L2 introduced as a curriculum in secondary school, but an increasing trend recently is to begin L2 subject in primary school (Ellies, 2015, p. 45). In 1962 and 1969, the United Nations conducted international seminars on this topic among linguists across the world, but till now this still remains as an open question (Wen, 2019). Nevertheless, as a policy-maker, it is imperative to understand that macro learning context differs across countries.

First difference is the language exposure. Taking English as an example, students' language exposure will be radically different in SEL and SFL settings. Subjects in many CPH experiments are immigrants to the country where L2 is the native language, and learners can have much more L2 exposure in the community, but for learners in countries such as China and Japan, classroom is probably the only source for English exposure. Moreover, Muñoz (2008) distinguishes naturalistic exposure from classroom exposure by stressing the former would relate to more native-like process. In other words, the amount and type of exposure needs to be considered when deciding when should be the time to introduce L2 curriculum.

Second is the purpose of L2 learning, for some countries it would be native-like mastery whereas in others, it's just to reach the communicative function. As we know from the earlier discussion that children will outperform adults in the ultimate attainment of L2 proficiency, it would be recommended to start L2 curriculum early if the purpose is to reach natively-like mastery, and if, however, the country only aims to use L2 as a lingual

franca, then starts later.

Additionally, the feasibility and cost-effect analysis matter too. For instance, policy-makers need to make sure there are sufficient qualified teacher resources, because as indicated in many CP theories, the pronunciation acquired in early childhood or around the age of primary school will last long, so if the teachers themselves are speaking the language with strong foreign accent, children's listening input will be unnatural or even mistaken, and such bad impact will last long too and become extremely hard to correct when students get older.

To conclude, as for how to raise bilingual children from perspectives of either parents, teachers or educators, it's never an easy work. Age is an important factor and can affect SLA through different mechanisms and, while recognising the important role of age, we also need to consider more comprehensively by taking into account other crucial factors and their interlinks.

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