

Age as a factor determining effectiveness of L2 acquisition

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Abstract

A common belief is that the earlier we begin learning a language, the better chance we have at mastering it. Some push this belief further, suggesting that after one reaches a certain critical age the odds of succeeding at attaining high proficiency in L2 are dropping dramatically. However, research remains inconclusive regarding not only at what age these cut off points should be, but also whether they are indeed a fact. Nevertheless, learners, teachers and policy makers tend to repeat after Krashen et al. (1979) that “adults and older children in general initially acquire the second language faster than young children (older-is-better for rate of acquisition), but child second language acquirers will usually be superior in terms of ultimate attainment (younger-is-better in the long run)” (p. 574). This article examines historical and recent empirical evidence gathered in relation to the views that earlier onset of L2 acquisition impacts the ultimate attainment of the learner, and explores why older learners are seen as those learning faster. It also points out an oversight regarding the comparison between younger and older learners without considering the setting in which the language acquisition takes place. Finally, pedagogical implications of juxtaposing the empirical evidence with the views often cemented in the mentality of students, teachers and policy makers are presented.

Keywords age of onset, rate of acquisition, ultimate attainment, naturalistic L2 learning, instructed L2 learning

1. Introduction

The relationship between age and successful second language (L2) acquisition has been a subject of debate for years (Singleton & Pfenninger, 2022). Krashen et al. (1979) extended the view stating that “the earlier, the better” by suggesting that while older learners will acquire the L2 knowledge faster, early age of onset¹ (AO) is more likely to lead to superior ultimate attainment (UA). Indeed, policymakers tend to equate early (AO) with successful L2 acquisition (European Commission, 2017). However, researchers point out that this relationship is not linear (van der Slik et al., 2022). It can also be moderated by multiple affective and environmental factors (Pfenninger, 2017), individual aptitude (DeKeyser, 2000), and even the mode of acquisition (Pfenninger, 2020).

2. Context

Based on the notion of imprinting (Lorenz, 1958), Lenneberg (1967) proposed that once the AO for language learning passed a critical period (CP), one’s ability to achieve native-like UA sets off sharply and irreversibly, regardless of other mediating factors (ibid.). Data from observation of input-deprived children confirm that in L1 learning AO is indeed negatively correlated with UA

(Hyltenstam & Abrahamsson, 2003). The cut-off points for discontinuity of L1 learning ability, initially associated with puberty (Curtiss, 1977), were observed to differ depending on the element of language, remaining at puberty for vocabulary acquisition, but varying between four and eight years old for the acquisition of syntax-related aspects, and six to twelve months to prevent impairment of phonetic perception and controls for verbal memory (Ruben, 1997).

Due to historical research, it is generally believed that in L2 education older learners are at disadvantage due to brain lateralization (Lenneberg, 1967) and loss of brain plasticity (Penfield & Roberts, 1959, p. 236). However, results from modern research challenge both views (Gutchess, 2014; Nenert et al., 2017). Aside from the debate regarding the shape of the attainment curve as a function of age (van der Slik et al., 2022) and potential cut-off AO (Abrahamsson et al., 2018), researchers disagree whether achieving native-like UA is at all possible (Dąbrowska, 2012; Hyltenstam & Abrahamsson, 2000), or even desirable (deBot, 2014). Moreover, while some results of studies indicate superior UA of learners who began learning L2 within CP, especially in areas of grammar (Johnson, 1992; Johnson & Newport, 1989; Patkowski, 1980) and pronunciation (Flege, 1999; Flege et al., 2010; Long, 2005; Oyama, 1976), other studies suggest that not only can mature learners achieve higher

¹ Age, at which language acquisition begins (Singleton & Ryan, 2004).

proficiency levels, they can also do it in a much shorter time (Muñoz, 2006; Oller & Nagato, 1974). Older learners' ability to acquire L2 to a high level could be mediated by their verbal analytical aptitude (Bley-Vroman, 1988), working memory (DeKeyser, 2018), and above everything with the type of instruction, while young children rely more on implicit learning (Bley-Vroman, 1988) and phonological short-term memory (DeKeyser, 2018). Finally, a decline in ability connected to biological maturation (Eubank & Gregg, 1999) might concern only certain aspects of language learning (Singleton & Ryan, 2004), and happen in a gradual way (Lamendella, 1977).

3. Empirical Evidence

In this section, results of empirical studies referring to Krashen et al.'s (1979) statement regarding the relationship between AO, UA, and rate of acquisition (RAQ) are presented and discussed. Further details regarding the populations and methodologies of the mentioned studies are available in Appendix 1 (for naturalistic setting) and Appendix 2 (for instructed setting).

3.1. Younger is Better

The tendency to confirm that “younger is better” seems to be prevalent mainly within naturalistic studies, focusing on observing immersed learners, either immigrants or students following a school program using L2 medium of instruction. In these studies, participants acquire their L2 knowledge mainly through implicit learning. Immigrant studies tend to show that earlier AO can be associated with higher success in attaining native-like pronunciation (Piske et al., 2002) and grammar (Hyltenstam, 1992; Patkowski, 1980), higher confidence regarding own skills (Dewaele, 2010), less language anxiety (Johnstone, 2009), and lead to an increased probability of resorting to L2 during communication with peers (Hammer & Dewaele, 2015; Jia & Aaronson, 2003).

More recently, Qureshi (2021) observed similar, significant effects of AO on grammaticality judgement test (GJT) scores for Arabic students exposed to English medium instruction (EMI). In the study, the students who started EMI in primary school outperformed students who started it only in tertiary education. However, these effects did not hold for the error-correcting task. In other words, although the early starters knew “something” was wrong, they were not able to locate and correct the erroneous phrases. Concomitantly, Bolibaugh and Foster (2021) confirmed a strong negative correlation between AO and participants' GJT scores of Polish-English immigrants. While recognition of grammatical sentences was unaffected by AO, it was negatively correlated with the rate of correct rejections of ungrammatical sentences. These grammaticality effects were mitigated for participants with higher scores on phonological short-term memory and affected by participants' ability for implicit statistical

learning² (ISL).

Strong grammaticality effects in the studies might suggest that the amount and quality of the absorbed input can be stronger predictors of successful L2 acquisition, than AO. Thanks to longer exposure, early starters were likely to benefit more from ISL, hence had a bigger chance to encounter one of the constructions in a correct form. However, recognising a structure as incorrect, rather than not-yet-met could require metalinguistic knowledge which would enable the participants to actively operate on grammar. Moreover, GJT alone is not reliable enough to measure participants' knowledge of grammar (Tabatabaei & Dehghani, 2012), and the way GJT is implemented can impact the type of knowledge it measures (Godfroid et al., 2015). Additionally, inconsistencies regarding ways to operationalise AO³ and UA, input quantity and quality, participants' socio-economic status, and their education levels, weaken presented evidence that lower AO correlates positively with successful L2 acquisition. Moreover, small sample sizes in some of these studies do not warrant using inferential statistics (Jung, 2020) which further debilitates the generalizability of the findings. Finally, relying on ANOVA instead of mixed models reduces the participants to a single cluster, without considering their family, class, teacher, or school characteristics (van der Slik et al., 2022).

3.2. Older is Better (and Faster)

Krashen et al. (1979) hypothesized that students commencing L2 acquisition later (also referred to as late starters or older learners) will learn faster than early starters, but they are unlikely to achieve as high UA. Nevertheless, research focusing on instructed L2 acquisition tends to provide evidence for superior attainment of older learners, especially regarding the rate of acquisition. Instructed studies refer to studies based on intentional L2 learning conducted in a school setting, within a limited number of instruction hours per week.

In the project examining English acquisition by Spanish-Basque bilinguals, Cenoz (2002) observed that the late group consistently obtained higher scores than the early starters in all aspects except for pronunciation (in which younger starters significantly outperformed the older ones), and listening (where the difference existed but was only marginally significant). Muñoz (2006) observed a similar trend in her big-scale, longitudinal Barcelona Age Factor project, in which later starters scored significantly higher on nearly all tests⁴. Pfenninger (2017) found AO effects malleable, in comparison to other macro-contextual and micro-contextual factors, which can mediate the AO-UA relationship. Moreover, Jaekel et al. (2017), in another longitudinal, large sample study focusing on receptive skills of two cohorts of German primary school learners differing in AO, show that despite the initial advantage of the younger group, within 4 years late starters not only caught up but also outperformed their peers in terms of receptive skills. In support of these

² Ability to extrapolate from stochastic data based on encountered sequential patterns (Conway et al., 2010).

³ As age of arrival (Patkowski, 1980; Piske et al., 2002), age of exposure (Qureshi, 2021), age of beginning of instruction (Hammer & Dewaele, 2015) or a

construct blurring the two definitions (Hyltenstam, 1992).

⁴ On one comprehension test the advantage of older learners though present, was not significant.

findings, Pfenninger & Singleton (2019) demonstrated that the initial strength of AO as a predictor of L2 acquisition success⁵ disappeared within six months of secondary L2 instruction in terms of productive skills: written and oral complexity, accuracy, and fluency; differences regarding other skills faded away by the end of the mandatory secondary school time⁶. A slight initial advantage of early starters has also been observed by Jaekel et al. (2022), who compared primary students' receptive skills after 2 and 4 years of L2 exposure. Baumert et al. (2020) in a separate large sample, longitudinal study examining the progress of students from over 1000 German federal state schools shows that late starters can reach parity in terms of receptive skills within five years. Interestingly, in the content and language integrated learning (CLIL) context, students' progress improves most significantly after they turn 10, however differences in AO beyond two years seem to negatively affect the UA in terms of written and oral fluency, accuracy, and oral lexical richness, but not on the other measures (Pfenninger, 2020).

Given highly representative large samples, longitudinal, systematic approach, consistent definitions of AO, and clear definitions of UA, the studies presented above provide strong support for Krashen et al., 1979 statement regarding superior rate of acquisition of late starters, while concomitantly disproving the hypothesis that lower AO can predict higher UA (in instructed setting). Presented evidence is in line with recently built L2 acquisition models of van der Slik et al. (2022), who suggest that frequently quoted discontinuities in L2 learning ability caused by maturational constraints may instead be linked to societal factors, such as leaving secondary education, associated with fewer opportunities to learn L2.

4. Pedagogical Implications

Context of L2 acquisition can impact whether the knowledge is likely to be internalized. Research indicates that although early immersion might give students an advantage regarding pronunciation, recognition of correct morphosyntax and a better attitude towards using the language, earlier introduction of L2 to the curriculum did not guarantee students' higher UA. One of the reasons for that might be a mismatch between widely offered input-limited learning modes and student needs.

While older students' cognitive maturity makes them better fitted for classroom instruction and formal testing (Singleton & Ryan, 2004), younger children (under the age of 10) might find more immersive, oracy-focused methods more beneficial (Pfenninger, 2020). Hence, one of the challenges is to ensure provision adequate for the age, to sustain student interest (Waninge, 2014). Another prominent factor in designing a successful L2 teaching program for early starters is ensuring the amount of input adequate for the learning mode (DeKeyser, 2018), to help

students achieve a combination of systematicity and automaticity possible thanks to ISL (Ellis, 2004). For the younger learners, it will mean significantly increasing the number of hours of exposure. Furthermore, it is important to create an environment supporting the use of L2 during the lesson (Piske, 2017), and within students' own inner circles, where L2 is used in relation to L1 (Moyer, 2014). Thus, reshaping the program to resemble CLIL seems the most promising solution to increase the L2 UA through continuous speech (Campfield & Murphy, 2014), while maintaining current provision times for other subjects, and without disadvantaging students' L1 development.

In the case of adolescent learners, it is of great importance to ensure that the transition between implicit learning and rule-based learning does not affect learning continuity (Tuyet, 2020), which could impact students' motivation negatively. To achieve that, teachers need to carefully balance the difficulty level not to overwhelm the students with unrealistic expectations, while maintaining the right level of challenge. Finally, learners of all ages need to be reminded that their AO does not predestine their UA, and challenges stemming from maturation, such as auditory acuity decline, can be overcome with appropriately adapted instruction.

5. Conclusions

The impact of age on learning processes has been debated for decades. Reasons for this controversy can be found in the way age-related research is designed. While studies concerning age in instructed settings are predominantly consistent in the way they operationalise key concepts such as AO and UA, immigrant-based research is full of conceptual misunderstandings. Thus, while the results regarding the lack of impact on AO on UA in instructed setting can be considered robust thanks to large samples, longitudinal approach, and treating age as a continuous, multifaceted variable, more research including better sampling and instrumentation is needed to strengthen the generalizability of the results regarding learning in immersed context.

In this article, empirical evidence speaking against Krashen et al.'s (1979) hypothesis that earlier AO shall be associated with higher UA was presented. Simultaneously, however, presented research lends support to the statement that older learners acquire foreign languages at a higher rate. To learn effectively, students with low AO appear to need an immersive, input-rich setting, and instruction focused on building links between L1 and L2 through activities promoting communication in L2. In the case of students starting learning a foreign language later, using more implicit, rule-based instruction full of examples and opportunities to both infer rules from context and test the hypotheses in practice seems most beneficial. Furthermore, informing the students that empirical studies disprove the "common wisdom" that "the younger the better" might be important to prevent the

⁵ Initially, AO was found to be a predictor of 60% of the tested skills (receptive vocabulary, written lexical richness, written fluency, oral lexical richness, oral accuracy, and written GJT)

⁶ For all the examined groups but the simultaneous bilinguals, who might be processing the L2 input differently on the account of biliteracy-driven superior working memory and better processing control (Bialystok, 2007).

impact of age-related defeatism on motivation. The latter is particularly important in the case of L2 geragogy⁷. These observations should be reflected in the way educational policies and foreign language curricula are designed, to ensure that students receive the provision which best suits their AO.

Katarzyna Li (née Jasinska-Belfort) is a polyglot and a language teacher. She has been teaching English, German and French as first and foreign languages in various academic settings for over 10 years in Japan, Poland, Brazil, Hong Kong, UK and Switzerland. She graduated Computer Science at the University of Southern Denmark, obtained PGCE in Modern Foreign Languages from University of Manchester, and is currently completing her MSc in Applied Linguistics at the University of Oxford. Her research interests include neurology of L2 acquisition, child multilingualism, vocabulary acquisition, factors that affect one's ability to attain high proficiency in L2, and statistical data analysis in context of education-related research.

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⁷ Theories encompassing learning methodologies designed for elderly adults.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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