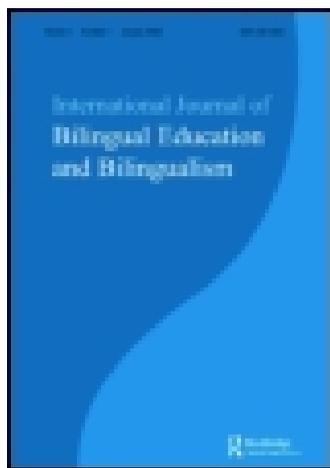


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Publisher: Routledge

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International Journal of Bilingual Education and Bilingualism

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rbeb20>

The literacy factor in the optimal age discussion: a five-year longitudinal study

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Published online: 05 Nov 2014.

To cite this article: Simone E. Pfenninger (2014): The literacy factor in the optimal age discussion: a five-year longitudinal study, *International Journal of Bilingual Education and Bilingualism*, DOI: [10.1080/13670050.2014.972334](https://doi.org/10.1080/13670050.2014.972334)

To link to this article: <http://dx.doi.org/10.1080/13670050.2014.972334>

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The literacy factor in the optimal age discussion: a five-year longitudinal study

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(Received 20 July 2014; accepted 27 September 2014)

This study examines the impact of L2 literacy on the development of writing proficiency in the L3, as related to age of onset (AO) of instruction, as well as the effects of AO on ultimate L3 attainment at the end of the period of normal schooling. Using longitudinal data for the same student cohort (200 Swiss learners of English) at the beginning and at the end of secondary education, it was found that advantages of an early start do not emerge even after a substantial amount of input has been gained. The late starters, who began English instruction five years after the early starters, were able to catch-up to the written performance of the early starters within six months, and this remained true even when the total number of hours of study input was not controlled for. Quantitative analysis revealed that this may be explained in terms of a possible ‘threshold level’ for L2 writing to transfer to the L3, since the late starters began L3 education with a better foundation in L2 German, which is their primary language of literacy. Furthermore, high statistical correlations were found between L2 and L3 literacy skills irrespective of starting age.

Keywords: age and language learning; bilingual education; EFL; multilingual language acquisition; language policy; language transfer

Introduction

The introduction of early foreign language programs into the primary school curriculum that took place in numerous countries as a result of the ‘younger-is-better’ view has recently raised a number of educational and research questions. For instance, those programs contradict the common-sense notion that initial reading and writing skills should be taught in a language that students already know and that they deny the possibility of positive transfer from the first language (L1) to another (Genesee 2007; Swain et al. 1990). In Switzerland, elementary schoolchildren are now taught English as a foreign language (EFL) almost at the same time as they receive formal literacy instruction in Standard German, that is, their first FL. As a consequence, educators and parents are often concerned about students’ development of German literacy skills; they fear that the early introduction of several FLs (English in grade 2 and French in grade 5) will impact negatively on students’ literacy skills in German. Furthermore, previous Swiss studies that involved beginning secondary school students with different starting ages (e.g. Pfenninger 2011, 2012, 2013a, 2013b, 2014) have shown that the new learning situation does not provide EFL learners with enough exposure in order for the early starters to benefit from the extended learning period. Thus, it is imperative at this stage to examine

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in more detail the long-term consequences of minimal input and the effects of onset age on the development of literacy skills. Such final state data are invaluable for ongoing classroom research, as well as for educators, teachers, policy-makers, and theorists, in that they afford unique perspectives on the limits of multiple FL acquisition in a formal, instructional setting.

The goals of this study were thus to analyze the development of written literacy skills in EFL, the relationship between length of instruction and language development, and the use of the language of literacy (Standard German as the L2) in the target language (English as the L3) as related to instruction onset age. To date, relatively little is known about the development over an extended period of written literacy skills vs. EFL skills in a learning situation where the L1 is not the primary literary and written language. Using longitudinal data for the same student cohort (200 Swiss learners of L3 English) makes it possible to examine in real time and in a thorough and detailed manner the relationships among (1) onset variables, (2) the correlation between learners' L2 and L3, and (3) ultimate school achievement.

The age factor

A multitude of empirical and review studies on the effect of age on second/foreign language acquisition has been published in recent years, and the body of naturalistic research and classroom-based research is still growing (see, e.g. Cenoz 2003, 2009; García Mayo and García-Lecumberri 2003; Granena and Long 2013b; Moyer 2004, 2013; Montrul 2008; Muñoz 2006, 2014; Nikolov 2009; for reviews see DeKeyser 2013; Singleton 2005, 2012; Singleton and Ryan 2004). However, the study of the age factor in multilingualism is a complex issue, because there is great diversity in the process of acquiring several languages and a large number of individual differences are involved.

In naturalistic studies, age of onset of acquisition has traditionally been seen as a strong predictor of level of ultimate FL attainment (see, e.g. Abrahamsson and Hyltenstam 2008). However, research on early FL learning in typical limited exposure classrooms has painted a somewhat different picture. In a nutshell, the bulk of classroom research carried out on the age issue indicates that there should be no advantage for an early start (see, however, Harley 1986 for an opposite view). Even in studies where instructional time is not constant, and early starters have had greater exposure than late starters, the former do not seem to show a significant advantage or faster learning rates (Larson-Hall 2008; Muñoz 2014; Pfenninger 2014). It has also been investigated whether early starters eventually surpass late starters in the same way as naturalistic L2 learners are generally observed to do; this does not seem to be the case. For instance, in the Barcelona Age Factor (BAF) project collected in Muñoz (2006), differences in proficiency in favor of late starters were still found even when differences in cognitive development disappeared with age (i.e. after 11 years). This begs the question to what extent this affects the absolute abilities of classroom learners by the time they graduate. Analyzing the interaction between age of onset (AO) and type of instruction, Pfenninger (2014) found that an early start was only advantageous if the early introduction of EFL was followed up by the use of English as an additional language of instruction in secondary school. The results suggested that age matters in language learning, but only in the best-case scenario, i.e. when it is associated with enough significant exposure and when students receive a combination of explicit FL instruction and communicative exposure. Muñoz and Singleton (2011, 11) suggest that given the high degree of interrelation of the factors that influence L2 acquisition, it seems reasonable to

hypothesize that the effects observed may result from the interplay of a range of variables (including AO) rather than the decline of any specific faculty. Thus, age must be seen to involve a number of issues, among them and notably the knowledge of previous languages, especially the L1, which may be more significant than neurological questions. Of course, in order to verify such a hypothesis a great deal more research is required.

The literacy factor

As early as the 1980s and 1990s, Singleton (1989, 1992) pointed to the existence of a 'head start' or initial advantage of older learners, which in the naturalistic learning situation appears to last about a year, but may last for several years in an input-poor environment (see also Krashen, Long, and Scarcella 1979). This fast progress in the first stages of language acquisition that was found for students with a later starting grade can be attributed to a variety of factors. For instance, it has been suggested that older students have the benefit of a well-developed L1 and, in particular, fully or well-developed L1 literacy skills that can facilitate acquisition of L2 literacy skills (Cummins 2000; Swain et al. 1990; Sparks et al. 2009). It is generally thought that the level and kind of L1 ability that children acquire prior to coming to school are important predictors of success in school. Already in the 1970s, Cummins addressed this issue in his 'Threshold Hypothesis' (Cummins 1976, 1978), which suggests that the level of L1 competence already reached by students determines whether they will experience cognitive deficits or benefits from schooling in the L2 (see Yun 2005 for a definition of such a threshold). If the L1 is not sufficiently developed, this will lead to low levels of L2 proficiency (for a critique of Cummins, see Martin-Jones and Romaine 1986). Lightbown (2000, 249) observes that:

[i]f the total amount of time of instruction is limited, it is likely to be more effective to begin instruction when learners have reached an age at which they can make use of a variety of learning strategies, including their L1 literacy skills, to make the most of that time.

With respect to the L1, there are numerous European studies that documented that there is no loss of L1 due to early exposure to a new language (e.g. Goorhuis-Brouwer and de Bot 2010).

Cummins (1979, 2000) also hypothesized in his 'Developmental Interdependence Hypothesis' that L1 and L2 literacy skills should be seen to be interdependent, i.e. they are manifestations of a common underlying proficiency (see also Spark and Ganschow's Linguistic Coding Differences Hypothesis, described in Sparks 2012). High levels of L1 proficiency help L2 acquisition, and conversely, high proficiency in the L2 has a positive effect on L1 development. Numerous large-scale longitudinal studies were able to show this strong relationship between L1 and FL writing proficiency as well as a relationship between L1 writing and metacognitive knowledge, although the authors were wary of making causal interpretations of relations between variables (see, e.g. Schoonen et al. 2003, 2009, 2011). For instance, many of the processes of writing in an L2, such as planning content, revising texts, and using metacognitive and strategic knowledge of the writing process to direct cognitive resources efficiently, are comparable to those of writing in an L1, even when two languages use different writing systems; hence, increasing L1 proficiency appears to facilitate the exercising of writing expertise directly in the L2 (Cumming 1989; Lasagabaster and Doiz 2003; Sasaki and Hirose 1996; Schoonen et al. 2011). Related to this, Geva and Ryan (1993) suggest that in addition to

transfer of linguistic skills from L1 to L2, basic individual differences on various indices of cognitive ability (e.g. nonverbal intelligence, memory) may be at least partially responsible for observed relationships between L1 and L2. They found high and significant correlations between memory measures and performance on linguistic tasks in L1 and L2 (see also McLaughlin 1990; Piske, MacKay, and Flege 2001; Sparks et al. 2009). However, it is still an open question as to exactly what extent L1 experience is helpful for FL/L2 writing, particularly with respect to onset age and length of instruction. Furthermore, while the findings summarized in this section are important and useful, it would be interesting to examine the learning situation in communities such as Switzerland, where a nondominant L2, rather than the L1, constitutes the primary language of literacy. Even though there are a number of studies involving groups of students whose L1 is neither taught nor supported in school (e.g. Bérubé and Marinova-Todd, 2014; Haenni Hoti et al. 2011; Van Gelderen et al. 2003), they have yielded conflicting results with respect to bilingual advantages in L3 learning. The present study attempts to fill this gap.

The present study

Aim and scope

The questions which guide my research (RQs) are the following:

- (1) What levels of written literacy do early starters achieve in their main language of literacy (L2 Standard German) and in L3 English at the beginning and at the end of secondary school education, compared to late starters?
- (2) To what extent do AO and L2 German have an effect on the written development of EFL?
- (3) How does L2 writing proficiency relate to EFL writing proficiency in the course of writing development?
- (4) Do late starters show more (positive or negative) effects of the language of literacy in the L3 than early starters?

In a sense, RQ1 aims at replicating some of the results of the BAF project (see Muñoz 2006; Torras et al. 2006). In order to examine the long-term effects of an early start, test results from 200 learners of English in Switzerland were obtained at the beginning and end of their secondary education. Longitudinal data are particularly revealing here in light of the findings that younger learners do not typically enjoy advantages when they are still in the first stages of L3 acquisition and that more advantages are seen in comparisons carried out at later stages (cf. Cenoz 2009). What is more, a longitudinal research design allows for greater confidence in establishing a causal relationship between various factors and FL writing development (Sasaki 2009, 52). Note that due to the nature of this study, it is not my goal here to investigate the relationship between L2 writing proficiency, EFL writing proficiency, and EFL linguistic knowledge.

Participants

Two groups of subjects were included in this study: a group of 100 learners with AO = 8 (early classroom learners [ECLs]) and a group of 100 students with AO = 13 (late classroom learners [LCLs]). Of the 200 participants, 103 were female and 97 male. They were clustered in 12 state schools in the canton of Zurich. Table 1 shows information about the subjects.

Table 1. Subjects participating in the study.

Group	Number of subjects	Age at time of testing (mean)	Age of onset	Length of instruction (years)	Length of instruction (hours)
ECL ₁	100	13–14 (13; 8)	8–9	5.5	440
LCL ₁	100	13–14 (13; 4)	13–14	0.5	50
ECL ₂	100	18–19 (18; 8)	8–9	10.5	1170
LCL ₂	100	18–19 (18; 9)	13–14	5.5	730

The first test series was administered after six months of EFL in secondary school, that is, after 440 (ECLs) and 50 hours of instruction (LCLs), respectively. The second data collection took place five years (680 hours) later. At no point were early starters mixed with late starters in the same class. The two groups were matched for biological age and type of instruction received but, crucially, they differed in the age of English instruction onset (AO = 8 vs AO = 13) and therefore the length of instruction. Because there was no variation in age of the participants, it was decided to group them according to their learning constellation instead of using correlational analysis.

The participants' L1 was Swiss German. Note that while Swiss German is a High Alemannic variety of German, it is hardly understandable to someone who knows only Standard German, as the two languages differ to some extent in lexicon, phonology, and syntax (for a discussion of this, see e.g. Berthele 2010). According to Lüdi (2007, 161), most Swiss citizens are monolingual during their childhood, but they usually become bilingual in the early primary grades at the latest when they receive formal literacy training in L2 German from first grade onward (age 7). This means that German-speaking Swiss children have to learn to read, write, and use a relatively unknown language all at once. In Switzerland, children receive formal literacy training in L2 German from first grade onward (age 7), which means that German-speaking Swiss children have to learn to read, write, and use a relatively unknown language all at once. Furthermore, while Standard German might be the language of literacy, it is not a dominant societal language. The New Education Act 2004 stipulated the early introduction of English as an L3 (after Standard German as the L2) in the second year of elementary school for eight-year-old children, five years earlier than previously stipulated. While children receive two 45-minute lessons in EFL per week in elementary school, in secondary school, there is an average of 3.5 hours per week of English instruction from grades 7–12. This model replaced the old program, in which English was taught as an L4 (after Standard German as the L2 and French as the L3) in the first grade of secondary school (year 7).

As other authors (e.g. Larson-Hall 2008) have noted correctly, hours of instruction may not equal input. Therefore, all students filled out a five-page questionnaire about their experience with English both in school and outside school; hours studying English in elementary school, secondary school, immersion programs, and/or regular L2 classes; and attitudes toward language. Students who had received additional instruction in English or had been exposed to English outside school were excluded from the sample (the initial sample comprised 296 students). However, there might be some error in this measurement, as students might not have recalled events properly from the previous 6–11 years (see below).

Measures and procedure

Students took a written grammaticality judgment test (GJT) and wrote a German composition and an English composition. The tests were administered in two 45-minute lessons. The effect of task order was controlled for in that the order of tests was inverted for half the sample. The GJT used here was a version of McDonald's (2006) test of basic English morphosyntax – adapted and used by Pfenninger (2011, 2012, 2013a, 2013b, 2014) – and included 49 items and 15 distractors designed to test judgments on word order in declarative sentences (4 items), adverb placement (8 items), negation (5 items), Yes/No questions (4 items), wh-questions (4 items), article usage (6 items), regular past tense (6 items), regular plural (6 items), and third-person singular markings (6 items). The reliability coefficient (KR-20) obtained was .90 for grammatical items and .95 for ungrammatical items. In order to prevent the participants from drawing on their explicit L2 knowledge, the task was timed. The students had a maximum of 11 minutes to make their judgments (approx. 10 seconds per sentence). They were asked to correct sentences considered ungrammatical.

In order to gather more naturalistic data, where the learners would be concerned with message conveyance instead of message form (Ellis and Barkhuizen 2005, 23), participants were asked to write an English argumentative essay on the pros and cons of (reality TV) talent shows and a German argumentative essay on the pros and cons of multiple foreign language learning in school. They were given 20 minutes to write each composition. For the sake of comparability it had been decided to use the same tests at testing one and testing two.

Finally, a biodata questionnaire was administered at both measurement times in order to collect biographical data and quantifiable information concerning their language learning experience (e.g. starting age, frequency of contact with L2 speakers, time spent abroad). Note that some questions were added at Time 2, e.g. number of instructional hours throughout secondary school.

Method

I applied four different analyses to my data: (1) a communicative holistic analysis, (2) a quantitative analysis, (3) an analysis of grammaticality judgments, and (4) a descriptive analysis of crosslinguistic influence. For the holistic evaluation of the English and German essays, I partly followed Jacobs et al.'s scale (1981), which, according to Lasagabaster and Doiz (2003, 140), requires two evaluators and considers the communicative effect of the speaker's linguistic production on the receptor and, therefore, comes close to the main objective of the process of language acquisition, namely interpersonal communication. My evaluation system consists of two criteria which measure different aspects of written production (Lasagabaster and Doiz 2003, 142–143):

- (1) Content (30 points): this category considers the development and comprehension of the topic as well as the adequacy of the content of the text.
- (2) Organization (20 points): several factors are considered here, namely the organization of ideas, the structure and cohesion of paragraphs, and the clarity of exposition of the main and secondary ideas.

The results for each of the criteria were added; the maximum score was 50. The final score was the average of the total points assigned by each of two independent evaluators. The interrater correlation (Pearson correlation coefficient) for the content subscore was 0.82, the organization subscore 0.89, and the total score 0.90. Note that it was decided to

include only two holistic measures, since previous authors have questioned the reliability and informativeness of holistic rating of compositions (for a discussion of this, see Torras et al. 2006, 157ff.).

Under the quantitative approach, competence was measured in terms of written fluency, lexical and syntactic complexity, and morphosyntactic errors. Following Wolfe-Quintero, Inagaki and Kim (1998), written fluency in English and German was examined in terms of words per T-unit (W/TU), which is defined as one main clause and all of the dependent modifying clauses (Ellis and Barkhuizen 2005). Syntactic complexity was examined in both languages using the clauses per T-unit (CL/TU) complexity ratio. Lexical complexity was examined using Guiraud's Index of Lexical Richness (GUI): word types divided by the square root of the word tokens. Accuracy (ERR/TU) was examined by counting (1) the number of misspellings (excluding 'mechanical errors' such as punctuation errors) and (2) the number of morphosyntactic errors per T-unit. According to James (1998), misspellings (or spelling errors) occur when the rules that determine how a given phoneme is to be represented in writing are broken. Such faulty grapheme to phoneme conversion occurs when the L2 learner applies their L1 rules to the L2 or when they apply the phonological rules of the L2 (James and Klein 1994). In this study, I will focus on misspellings that are due to lexical transfer (e.g. *braun* for *brown*). Morphosyntactic errors included omission (e.g. *he love singing*), overuse (e.g. *she cans again drives*), substitution (e.g. *many people singing*), (ir)regularization (e.g. *he taked*), misinformation (e.g. *he get's*), random misorderings¹ (e.g. *singer bad*), systematic misorderings (e.g. *When people good things make*), and 'other' (e.g. agreement errors, as in *I doesn't like this*; see McDonald and Roussel 2010; Pfenninger 2011, 2014).

For the analysis of crosslinguistic influence, I counted (1) the average number of morphosyntactic transfer errors (as opposed to developmental errors) and (2) the average number of terms (or expressions) transferred from Swiss German and Standard German into English (code-switches and code-mixes). Code-switching includes terms, phrases, or sentences produced in Swiss German or German (e.g. *it's a money-anlage*), while code-mixing (also referred to as 'morphological blends' or 'lexical inventions') refers to the production of interlanguage forms in which a free or bound nontarget morpheme is mixed with a different free or bound target morpheme to form an approximated target language word (e.g. *she fangs* [from German *fangen* 'catch'] *the frogs*).

The reason why the focus is on absolute morphosyntactic abilities in this study is that (1) morphosyntax is one of the more reliable measures of FL proficiency, particularly with respect to predicting writing scores (Schoonen et al. 2011); (2) measures of syntax, morphology, and literacy-related skills assess a cognitive dimension of language proficiency, in contrast to basic interpersonal communicative skills (Cummins 1981, 133); (3) L2 morphosyntax seems to be more vulnerable to processing difficulties than L2 lexico-semantics (independent of the L1) and therefore more susceptible to age (for a review, see Granena and Long 2013a); and (4) the receptive mode, which often constitutes late starters' primary use of English, might make them aware of English vocabulary, but probably less so of English grammar, which is less salient in language input (Schoonen et al. 2011, 70). Similarly, code-switching and word-internal code-mixing can also shed light on the (possibly different) ways of learning of early vs. late starters (e.g. Celaya and Navés 2009; Celaya, Torras, and Pérez-Vidal 2001; Pérez-Vidal, Torras, and Celaya 2000), even though research on the relationship between the introduction of FL teaching at different ages and code-switching/mixing is still scarce (but see, e.g. Agustín Llach 2011; Celaya 2006) and rather limited to comparisons of different age groups, rather than different AO groups.

Results

Table 2 shows the results of the series of analysis of variance (ANOVA) to compare the ECLs and LCLs at each data collection time in the subskills of writing ability and grammaticality judgments described above.

The results show that at Time 1, the two AO groups did not behave alike as far as most dependent variables are concerned (RQ1). With respect to the target language (L3 English), lexical complexity (GUI-E) and code-switching (COD/TU-E) yielded significant differences in favor of the early starters (ECLs), with rather small effect sizes ($\eta^2 = .112$ and $.054$, respectively). Thus, the ECLs displayed a greater variety of content words, and they did not have recourse to previous linguistic knowledge to the same extent as the LCLs. However, the first analysis also showed that even with many fewer hours of instruction, when measured at the same age, the LCLs performed better than the ECLs in one variable at Time 1, i.e. in the area of morphosyntactic accuracy (ERR/TU-E), for which the effect size was small ($\eta^2 = .063$) but nevertheless significant. For content (CONT-E), organization (ORG-E), fluency (W/TU-E), and syntactic complexity (CL/TU-E), the two groups obtained similar scores (see also the results of the BAF project in Muñoz 2006). With respect to the language in which they had become literate (L2 German), the LCLs significantly outperformed the ECLs on all tested measures; they used more lexical variety, more complex structures involving coordination and subordination, wrote longer clauses and sentences, and used more clauses. For some of these dependent variables (e.g. fluency and lexical and syntactic complexity), the effect size might be small but is nevertheless significant.

At Time 2, only one of the contrasts, grammaticality judgments, indicates a significant difference in favor of the late starters, albeit with a rather moderate effect size ($\eta^2 = .031$). This means that, on the one hand, the LCLs had caught up in all areas in which they had been significantly outperformed at Time 1, and, on the other hand, the temporary lag in L2 literacy of the ECLs had vanished by grade 12. Thus, the findings suggest that greater accumulated hours in English at grade 12 are not automatically associated with better student performance.

In order to see whether there would be a difference between the early and late starters with equal amounts of input or equal pretest scores, a one-way analysis of covariance (ANCOVA) with posttest scores as the dependent variable, AO as independent variable, and pretest scores as the covariate was used to statistically match learners in both groups with equal amounts of input. ANCOVA analysis confirmed the results of the ANOVA tests in that there was no age effect for group (early vs. late starters) on content (CONT-E $F = 0.15$, $df = 1$, $p = .695$, $\eta^2 = .000$), organization (ORG-E $F = 1.62$, $df = 1$, $p = .204$, $\eta^2 = .004$), lexical richness (GUI-E $F = 1.56$, $df = 1$, $p = .213$, $\eta^2 = .008$), fluency (W/TU-E $F = 2.22$, $df = 1$, $p = .138$, $\eta^2 = .011$), syntactic complexity (CL/TU-E $F = 0.17$, $df = 1$, $p = .684$, $\eta^2 = .001$), accuracy (ERR/TU-E $F = 0.22$, $df = 1$, $p = .637$, $\eta^2 = .000$), or code-switching (COD/TU-E $F = 0.002$, $df = 1$, $p = .968$, $\eta^2 = .000$). However, there was an age effect for the grammaticality judgment task in favor of the late starters (GJT-E $F = 5.91$, $df = 1$, $p = .016$), but the effect size was rather small ($\eta^2 = .030$). The covariate of English pretest score was only significant for two of the tested measures, that is, content (CONT $F = 202.33$, $df = 1$, $p < .001$, $\eta^2 = .506$) and organization (ORG $F = 238.49$, $df = 1$, $p < .001$, $\eta^2 = .546$), both with very high effect sizes. Thus, the results revealed that prior knowledge as a consequence of more instructional time did not have a major effect on the written skill areas tested here. These results coincide with those of previous studies (e.g. Torras et al. 2006).

Table 2. Means (and standard deviations) and ANOVA results for the evaluation of written production and response.

	Time 1						Time 2					
	ECL ₁	LCL ₁	<i>F</i>	<i>df</i>	<i>p</i>	η^2	ECL ₂	LCL ₂	<i>F</i>	<i>df</i>	<i>p</i>	η^2
CONT-E	19.14 (2.61)	19.05 (2.19)	0.07	1	.792	.00	27.23 (1.95)	27.10 (2.01)	0.22	1	.643	.00
CONT-G	23.17 (2.77)	25.65 (2.16)	49.87	1	<.001*	.20	28.71 (1.43)	28.57 (1.87)	0.36	1	.552	.00
ORG-E	10.52 (1.99)	10.42 (2.05)	0.12	1	.727	.00	16.67 (2.96)	16.90 (2.45)	0.36	1	.550	.00
ORG-G	13.98 (2.97)	15.96 (2.97)	24.17	1	<.001*	.10	18.39 (1.50)	18.33 (1.67)	0.07	1	.789	.00
GUI-E	4.92 (1.30)	4.17 (0.78)	24.68	1	<.001*	.11	7.57 (0.80)	7.73 (0.77)	1.99	1	.160	.01
GUI-G	7.24 (1.28)	7.90 (1.30)	12.96	1	<.001*	.06	9.02 (0.88)	9.03 (0.76)	0.01	1	.918	.00
W/TU-E	10.88 (3.63)	10.78 (3.22)	0.05	1	.831	.00	14.91 (2.97)	14.15 (4.08)	2.26	1	.134	.01
W/TU-G	13.08 (3.23)	15.20 (4.17)	16.2	1	<.001*	.08	16.74 (3.77)	16.92 (3.60)	0.13	1	.723	.00
CL/TU-E	1.43 (0.39)	1.45 (0.31)	0.14	1	.709	.00	1.69 (0.61)	1.72 (0.46)	0.16	1	.687	.00
CL/TU-G	1.60 (0.57)	1.89 (0.67)	10.88	1	.001*	.05	2.11 (0.47)	2.19 (0.51)	1.28	1	.259	.01
ERR/TU-E	1.07 (0.63)	1.77 (0.58)	12.27	1	.001*	.06	0.61 (0.44)	0.62 (0.56)	0.02	1	.888	.00
COD/TU-E	0.47 (0.55)	0.75 (0.64)	10.91	1	.001*	.05	0.13 (0.23)	0.12 (0.21)	0.01	1	.918	.00
GJT-E	24.2 (3.78)	23.45 (3.41)	2.17	1	.142	.01	41.93 (3.31)	42.95 (2.79)	5.55	1	.019*	.03

Note: Bold type = significantly higher scores.

Note: *E* = English; *G* = German; CONT = Content; ORG = Organization; GUI = Guiraud's Index of Lexical Richness; W/TU = fluency; words per T-unit; CL/TU = syntactic complexity: clauses per T-unit; ERR/TU = accuracy, morphosyntactic errors per T-unit; COD/TU = code-switching/mixing: number of terms (or expressions) transferred from German into English per T-unit; GJT = grammaticality judgment task.

*Statistically significant at $\alpha < .05$.

Further analyses were conducted in order to examine the impact of AO and L2 literacy skills (RQ2). Multivariate analysis of covariance (MANCOVA) indicated that L2 writing ability was more beneficial than AO for the improvement of written skills in the L3 (Table 3).

It becomes clear at first glance that the factor which influenced the learners' reactions was L2 literacy skills rather than AO, considering the consistently high effect sizes for the L2 variable. The (rather small) age effect on fluency (W/TU) was due to an unexpected interaction between AO and L2 German scores at Time 2.

RQ3 then asks whether there was any direct relationship between the L2 German scores and the L3 English scores on the first five measures that were administered in both languages (CONT, ORG, GUI, W/TU, and CL/TU). I found high (and significant) correlations between L2 German scores and L3 English scores in almost all the measures.

It is apparent that the relationship between L2 and L3 writing proficiency already existed at Time 1 and did not change substantially over the period of five years. The high correlations across almost all measures add further support to the hypothesis that L2 competence, rather than AO, plays a paramount role in the results. Of course it cannot be ascertained beyond doubt if there indeed is a causal relationship between high L2 writing ability and the participants' L3 writing ability, but owing to the longitudinal design, it is highly unlikely that this factor might have simply co-occurred with good L2 writing. Furthermore, previous longitudinal studies (e.g. Schoonen et al. 2009, 83) have found similar high correlations between L1 and FL writing scores. Furthermore, there was no significant interaction between AO and L2 literacy skills, meaning that both factors exert independent influence on language attainment outcomes.

Table 4 reveals another interesting pattern. As outlined above, the comparison of the variables obtained with ANOVA is significantly favorable to the LCLs in almost all L2 measures at Time 1. Since L2 written skills highly (and significantly) correlated with TL skills, it could be assumed that the factor that appears to explain the LCL's high productive and receptive scores on the various L3 measures at Time 1 was 'L2 literacy skills.' The late starters seem to have been able to successfully transfer their knowledge from their L1 and L2 into their TL and, thus, rapidly caught up to the achievements of the

Table 3. MANCOVA follow-up test results.

	AO			
	<i>F</i>	<i>df</i>	<i>p</i>	η^2
CONT	0.22	1	.639	.000
ORG	2.40	1	.124	.004
GUI	1.85	1	.180	.008
W/TU	11.31	1	.001*	.011
CL/TU	0.42	1	.518	.001
	L2 literacy skills			
	<i>F</i>	<i>df</i>	<i>p</i>	η^2
CONT	85.34	1	<.001*	.150
ORG	85.62	1	<.001*	.134
GUI	0.17	1	.679	.008
W/TU	772.40	1	<.001*	.784
CL/TU	291.76	1	<.001*	.599

*Statistically significant at $\alpha < .05$.

Table 4. Correlations between L2 writing ability and L3 writing ability (Pearson correlation coefficient r).

	Time 1		Time 2	
	ECL ₁	LCL ₁	ECL ₂	LCL ₂
CONT	0.81**	0.73**	0.73**	0.75**
ORG	0.82**	0.72**	0.73**	0.67**
GUI	0.27*	-0.05	0.42**	0.40**
W/TU	0.89**	0.85**	0.85**	0.92**
CL/TU	0.64**	0.79**	0.78**	0.76**

*Statistically significant at $\alpha < .05$.

**Statistically significant at $\alpha < .01$.

early starters. In the one area where no L2–L3 correlations are found at Time 1, lexical complexity (GUI), the LCLs are outperformed by the ECLs in the L3.

In sum, the findings seem to suggest that (1) the language of literacy can indeed be used as the yardstick of FL attainment for learners beginning at different ages, even if it is not the learners' L1, and (2) a high level of literacy skills is not a prerequisite for high levels of proficiency and response in late starters only.

To answer my last RQ, late starters do not show more negative effects of the L2 in L3 production and/or response than early starters. Table 5 sheds light on the sources of omission, overuse, substitution, (ir)regularization, misformation, and random and systematic misorderings of morphological forms and syntactic structures by making a distinction between morphosyntactic transfer errors, developmental errors, which are due to the inherent featural complexity and multiple functions of the forms in question, and spelling errors, which are due to lexical transfer.

While the LCLs produced significantly fewer morphosyntactic errors in general at Time 1 (total ERR/TU), there were no significant differences between the number of transfer errors, developmental errors, and spelling errors produced by the two AO groups at either measurement time. This indicates that (1) transfer is not a problem exclusive to late starters, as is sometimes suggested in naturalistic studies, and (2) it seems that the two age groups had similar mental representations of the sounds of the English words.

In a second step, the code-switching results (COD/TU-E) merit further consideration. The results in Table 2 indicate that at the beginning of secondary education, the LCLs mix codes more often than the ECLs, albeit with a rather small effect size ($\eta^2 = .05$). However, results also showed that the switches of the LCLs did not come to serve as a permanent explicit avoidance strategy. While the LCLs code-mixed and code-switched frequently at Time 1, they seemed to have abandoned those strategies over the course of their secondary education.

Discussion

Considering the data analyzed here, it can be concluded that an early AO does not seem to have a beneficial effect on the subjects' performance in L3 English, at least with respect to the written production and response measures tested. Only in the analysis of some of the measures tested at Time 1 did the effect of an early AO become evident, but those differences between early starters and late starters disappeared with increasing L3 proficiency. These results are consistent with recent studies conducted in Spain

Table 5. Means (and standard deviations) and ANOVA results for the evaluation of error types.

	Time 1						Time 2					
	ECL ₁	LCL ₁	<i>F</i>	<i>df</i>	<i>p</i>	η^2	ECL ₂	LCL ₂	<i>F</i>	<i>df</i>	<i>p</i>	η^2
Transfer errors	1.12 (0.50)	1.00 (0.43)	3.31	1	.070	.02	0.17 (0.18)	0.19 (0.21)	0.52	1	.470	.00
Developmental errors	0.49 (0.48)	0.39 (0.31)	3.06	1	.082	.02	0.18 (0.19)	0.17 (0.22)	0.12	1	.731	.00
Spelling errors	0.46 (0.28)	0.38 (0.32)	3.54	1	.061	.02	0.25 (0.22)	0.26 (0.23)	0.10	1	.754	.00
Total ERR/TU	1.07 (0.63)	1.77 (0.58)	12.27	1	.001*	.06	0.61 (0.44)	0.62 (0.56)	0.02	1	.888	.00

*Statistically significant at $\alpha < .05$.

Bold type represents significantly higher scores (i.e., lower error rates).

(Celaya and Navés 2009; García-Mayo and García-Lecumberri 2003; Muñoz 2006, 2014; Pérez-Vidal, Torras, and Celaya 2000). Controlling for total hours of input revealed that when younger starters showed better outcomes than older starters in situations in which the former had had a greater amount of instruction, this was not due to the learners' early starting age but to the greater instruction time to which they had had access due to their early start. Thus, in the long run, postpuberty learners can achieve levels of success as high as those of prepubertal learners, a common finding among the literature on the age issue in classrooms. Perhaps more surprising are the findings that (1) the late starters in this study only needed a very short period (i.e. six months) to catch-up with the early starters, and (2) the early starters did not surpass late-starting formal learners in the long term.

Interpretation of these results requires consideration of another independent variable – written literacy skills in the L2. One of the remarkable outcomes of this study involves the lag in the development of L2 writing ability among students whose first exposure to the L3 began in grade 2, which is similar to students in the initial years of bilingual programs in which all academic instruction is presented in the L2 (see, e.g. Genesee 2004). The late starters began L3 education with a better foundation in their L2, that is, the language in which they had become literate. With this essential basis, they seemed to have been better equipped to transfer their conceptual vocabulary and grammatical knowledge to the L3. The early starters, however, were still developing their L2 when they were faced with the task of learning EFL, and, thus, their unstable knowledge of the L2 might have been insufficient to have a positive influence on their learning of the L3. This finding supports the notion of 'linguistic interdependence' (Cummins 1976, 1978) as well as the idea of a threshold level for L2 writing to transfer to L3 in that language learners require sufficient levels of proficiency in their language of literacy to be able to sustain the self-regulated behavior that writing performance in a FL requires (see also Schoonen et al. 2011, 66). The most important feature of the ECLs' lag in L2 literacy skills is that it is temporary, providing reassurance to educators and parents that students' English language skills will not be sacrificed by an early EFL program. Although the ECLs lag behind the LCLs in some aspects of Standard German literacy skills at the beginning of secondary school, these differences disappear with time.

The findings also suggest that high writing ability in the L2 is likely to contribute to successful written attainment in the L3 irrespective of AO. In other words, the positive effects of a high degree of L2 writing proficiency do not only compensate for the negative effects of a late starting age in the LCLs, but there are also similar L2 effects in the ECLs. These results support research carried out in similar projects (e.g. Schoonen et al. 2011; Swain et al. 1990). The participants' morphosyntactic knowledge and their writing proficiency might have a common source (e.g. language aptitude), creating the strong correlation found in this study. Future research is needed to identify this common source.

There are of course many more explanations to account for these findings, some of them linked to the difference in the type of input between primary and secondary school. For instance, the ECLs' accuracy scores in English might lag behind the LCLs' scores in grade 7 due to a lack of formal instruction in English in elementary school (see Pfenninger 2014). Once they grew and got used to formal instruction, however, the ECLs showed gains in performance as well. It also has to be borne in mind that an early start in an FL may not equal an early start in FL writing, at least not in a communicative learning environment such as the primary school classroom with its implicit learning approach. Another answer may be that the ECLs had simply not received enough input in elementary school in order to profit from their early start. Larson-Hall (2008) found that

age seems to play a non-negligible role in improving FL acquisition, given that language learners receive enough input (this means 6–8 hours a week over 6 years and 44 weeks per year). The impressive progress of the LCLs in the first six months might also be explained in terms of the fact that those participants indicated in the biodata questionnaire that they had taken advantage of language learning opportunities outside elementary school (e.g. TV, Internet, etc.) and, thus, did not come to late regular instruction with no exposure to English at all. However, even though they were in constant contact with English through the media, for instance, they had relatively little experience in expressing their thoughts and intentions in written English.

Conclusion and educational implications

The results of this longitudinal, comparative study of students' written competence in their L2 and L3 have contributed to the growing body of research showing the existence of very proficient older starters and at the same time have explored early starters' well-documented lags in achievement in more detail. With respect to the written measures tested here (written language skills defined not only in terms of errors but also in terms of the communicative and functional adequacy of the text to the assigned task), parity between early starters and late starters was already reached after six months of receiving EFL instruction in secondary school, even when the length of instruction was not held constant and the early starters had an advance of five years of EFL instruction. Furthermore, the findings make a strong case for the argument that even after more hours of input than reported in most previous studies (over 1,000 instructional hours), we still do not see differences between an early and late start. This is a crucial result in light of the increasing number of early multiple FL programs in Europe and the tendency of FL educators and policy-makers to regard age as the crucial if not the only critical variable.

Another important conclusion in the context of this study is that almost all subskills that form an integral part of the skill of L3 writing correlate with L2 writing ability and that literacy skills in one's primary language of literacy enhances FL learning. It is also apparent from this study that there is an effect of L2 writing skills independent of AO. Thus, L1 and L2 educators and policy-makers should understand that mastery of literacy skills in the elementary school years is important for students attempting to learn an FL several years later. In communities that seek quadrilingual competence such as Switzerland, where two languages are commonly used in everyday life and bilingualism thus has to be introduced early because the L1 is not supported in the school context, introduction of the L3 (and L4) in higher grades may be sufficient. Findings from this study also have important educational implications in light of the increasing number of multilingual students (e.g. children with an immigrant background), who, in the early primary grades, have to learn and become literate in two languages other than the one first learned at home.

Of course, since many factors such as oral and aural skills have not been tested in this study, the results must be interpreted with caution. In order to ascertain that test results at grade 7 really reflect the greater academic strengths of ECLs – and since writing proficiency is notoriously difficult to measure – future analyses of further types of tests are required. However, as this study reflects the findings of the majority of studies in that it found a positive effect for a late starting age in an input-poor environment, similar morphosyntactic performance and response of early and late starters might not be the only abilities that are not affected by an early AO.

There are many other relevant issues that could not be accommodated in this paper, including individual factors such as learner styles, learning strategies and metacognitive knowledge, and their interaction with age effects. How effectively do multilingual learners at different proficiency levels employ learning styles and strategies consciously directed at morphosyntax? Do the two starting age groups differ in type and number of strategies such as writing practice and self-monitoring techniques? To what extent do cognitive and metacognitive strategies correlate with accuracy, complexity, and fluency scores and how do they change over time? How are individual changes affected by various sociocultural factors? These questions beg further questions about memory, risk-taking tolerance, self-beliefs, self-efficacy, personality traits, motivation, and desire to attain a high proficiency level. A well-rounded instrument design is needed to put these factors into perspective and to test their respective strength for an age effects model.

Note

1. For a discussion of random vs. systematic misorderings, see Ellis and Barkhuizen (2005).

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