

Age Effects in a Study Abroad Context: Children and Adults Studying Abroad and at Home

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This study examines the effects of learning context and age on second language development by comparing the language gains, measured in terms of oral and written fluency, lexical and syntactic complexity, and accuracy, experienced by four groups of learners of English: children in a study abroad setting, children in their at-home school, adults in a study abroad setting, and adults in their at-home university. Results show that the study abroad context was superior to the at-home context, and more advantageous for children than for adults in comparative gains, although adults outscored children in absolute gains. The interaction between learning context and age suggests that studying abroad was particularly beneficial for children, who also had more opportunities for oral language practice.

Keywords study abroad; learning context; age of L2 learning; age-related differences; L2 acquisition; oral skills; written skills

Introduction

Context and age are two central sources of influence in the processes and outcomes of second language (L2) learning. When an individual learns a new

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language, the context in which this activity takes place plays a decisive role (e.g., Collentine, 2009; Freed, 1995; Freed, So, & Lazar, 2003; Freed, Dewey Segalowitz, & Halter, 2004; Llanes, 2011). It determines factors such as the quality and quantity of the input the learner encounters, the opportunities he or she has to practice the L2, and the type of instruction he or she receives in the L2. Across possible contexts for language learning, research has traditionally focused on learners in informal or naturalistic language learning situations and, to a lesser extent, in formal or instructed language-learning situations. Much less research has been conducted on study abroad (SA) contexts, in which learners experience a combination of formal and informal learning, engaging in language instruction in the L2 country for a definite period of time. In fact, most published research on SA has appeared within the last two decades (see review by Kinginger, 2009). And while the influence of learners' age on the learning outcome of children, adolescents, and adults has been researched in both informal and formal L2 learning settings (Hyltenstam, 1992; Muñoz, 2006b; Oller & Nagato, 1974), this has not yet been the case with studies on SA, where research has focused primarily on undergraduate students' L2 development (Dewey, 2004; Freed et al., 2004) without consideration of the age factor. This study aimed to fill this gap by comparing L2 development in children and adults in an SA context and an at-home (AH) context, thereby contributing to both the area of SA research and the area of age-related studies.

The Effects of SA Experiences on L2 Learning

SA has been claimed to be the most efficient way to learn an L2 because social immersion in the L2 community offers learners what seems to be an ideal opportunity to acquire the language: a combination of formal (language instruction) and informal (out-of-class) learning (Allen, 2010; Davidson, 2007). However, there are still unexplored issues regarding the learning benefits of SA and not all L2 domains have received the same amount of attention (Llanes, 2011).

To begin with, oral production skills have very frequently been investigated and are believed to be the skills that benefit the most from an SA experience (Davidson, 2010; Freed, 1995; Lennon, 1990; Llanes & Muñoz, 2009; Segalowitz & Freed, 2004), although not always. Freed et al. (2004), for example, found that participants in an immersion (IM) context outscored participants in an SA setting, and Serrano, Llanes, and Tragant (2011) found that participants in an SA context experienced similar L2 gains to participants in an intensive AH setting. The acquisition of vocabulary in an SA context has been the focus of research in a number of studies as well, and it has been concluded that SA

experiences are beneficial for participants' lexical improvement (Dewey, 2008; Foster, 2009; Ife, Vives, & Meara, 2000; Milton & Meara, 1995; Serrano et al., 2011).

In contrast, the area of listening comprehension has not very frequently been examined in relation to the SA context, and yet the results found are positive. Cubillos, Chieffo, and Fan (2008), for example, examined the listening comprehension development of two groups of participants, SA and AH. They found that SA students with higher listening comprehension scores on the pretest experienced greater gains during their SA as well as higher levels of confidence, compared to the AH students. Likewise, Dyson (1988) examined the listening skills of a large number of British undergraduates learning different L2s and found that the SA experience was beneficial for the improvement of this skill. Finally, Llanes and Muñoz (2009) examined the listening skills of participants of different ages who spent 3 or 4 weeks abroad and found that their listening comprehension ability improved significantly on the posttest.

Another area in which research has been scarce is the influence of learning context on reading development, and positive effects are unclear in the limited studies available. Dewey (2004), for example, compared the L2 reading development of American students studying Japanese as an L2, half of them in an IM setting and half in an SA setting. He found that the participants in the SA context only differed from those in the IM context in that they had gained more self-confidence. Similarly, Davidson (2010) examined the effects of length of stay in the host country on learning outcomes across skills and found that, in general, the participants' reading skills did not change greatly over the SA experience.

The study of the effects of learning context on writing skills has yielded controversial results. While authors such as Freed et al. (2003) have found that the SA context was not particularly beneficial for the improvement of writing skills, other researchers have observed clear gains (Pérez-Vidal & Juan-Garau, 2009; Sasaki, 2004, 2009). In the study by Freed et al. (2003), the participants' L2 written development was examined both through analytical measures (of grammatical accuracy, syntactic complexity, and lexical density) and by using judges' holistic scores, and no differences were found between SA and AH participants. In the study by Pérez-Vidal and Juan-Garau (2009), participants significantly improved their written fluency and lexical complexity after spending 3 months abroad, whereas the same participants did not experience any significant gains during the previous 6 months of formal instruction in their AH university. These authors also examined the participants' written performance 15 months after their return from their SA and found that their scores decreased in most measures. Sasaki (2009) examined L2 written development

both quantitatively (through composition scores) and qualitatively (through interviews) and found that those participants who went abroad improved their composition scores over 3.5 years, whereas AH participants did not. Sasaki also found that SA participants, especially those who spent more than 4 months abroad, were more motivated to write in the L2.

In other areas such as morphosyntax (Collentine, 2004; DeKeyser, 1991) and phonology (Díaz-Campos, 2004; Mora, 2008), it has been reported that SA students do not experience significant gains after a period abroad. In contrast, positive outcomes as a result of an SA experience have been documented in the area of pragmatics and sociolinguistics (DuFon & Churchill, 2006; Félix-Brasdefer, 2004; Kinginger & Farrell, 2004; Regan, Howard, & Lemée, 2009; Taguchi, 2008).

The Effects of Participants' Age on L2 Learning

The first review of the literature on age effects, mainly in naturalistic language learning settings (Krashen, Long, & Scarcella, 1979), showed that older learners were faster in the initial stages, especially in the acquisition of morphosyntactic features, but that younger learners tended to outperform them in the long term. These findings were generalized to cover all learning contexts and contributed to the spread of the belief that younger is better in all circumstances, despite the recognition by some that qualitatively different learning mechanisms may have differential triggering effects depending on context (Bley-Vroman, 1988; DeKeyser, 2000). Recent research, however, has shown that learning context moderates age effects in L2 learning (e.g., Muñoz, 2006a). Specifically, age effects may differ according to whether the learning context provides learners with unlimited exposure to the target language (as in naturalistic language learning settings) or whether exposure to the language is limited to a great extent (as in foreign language learning settings) or to some extent (as in school immersion settings) (see Muñoz, 2008a).

Research on age effects in naturalistic language learning settings typically examines participants' ultimate attainment in relation to their arrival age or age of immigration. As seen above, younger starters have been observed to outperform older starters in the long term, and hence they are more likely to resemble native speakers of the target language. From a theoretical point of view, this line of research is mainly concerned with the existence, scope, and characteristics of a critical period for L2, following Lenneberg's (1967) proposal of the critical period hypothesis. According to this hypothesis, there is a period in life—between the age of 2 and puberty—in which first language (L1)

acquisition must necessarily take place or otherwise it will be impossible or incomplete. Most importantly, Lenneberg's formulation concerned acquisition through "mere exposure" (1967, p. 176), thus binding age effects to the learning context. Subsequently, Johnson and Newport (1989) claimed that L2 acquisition resembles L1 acquisition in that native-like attainment is possible only if it begins during this privileged period. Other studies have also found higher outcomes in L2 learners who arrived in the country of immigration at an earlier age than in learners who arrived later in life (e.g., DeKeyser, 2000). However, no consensus exists as to the upper bound of the alleged critical period, and different offset ages have been suggested in the literature. An alternative suggestion is that rather than one critical period there may be different sensitive periods (with less abrupt boundaries) for different language components. In that respect, Long (1990) claims that the posited closure for phonology may be as early as age 6, while it may be around 15 for morphology and syntax. Nonetheless, other authors argue in favor of an age-related decline that is more in consonance with general cognitive deterioration than with the existence of a critical period ending sometime around puberty (see Birdsong, 2006).

Research on age effects in instructed foreign language (FL) learning settings typically compares early and late starters' language achievement, either after the same number of instructional hours (hence comparing different-age participants) or at the same age (hence comparing participants after different amounts of instruction) (see Muñoz, 2008b). Results from this line of research have shown that in typical FL learning settings older learners are more efficient learners. That is, they obtain higher levels of achievement in the L2 than younger learners after the same number of hours of instruction (see Muñoz, 2006b). As an illustration, the Barcelona Age Factor (BAF) project led by Muñoz (2006) compared four groups of learners with different ages of initial learning (8, 10, 14, and 18+) after the same number of hours of instruction (200, 416, and 726). It was found that older starters outperformed younger starters in a set of oral and written tests in the three comparisons. However, the third comparison (after 726 hours of instruction) revealed that differences diminished, particularly in those areas in which the influence of learners' cognitive maturity may be said to play a lesser role (i.e., phonetic discrimination, fluency). For Muñoz (2006a), these findings suggest that it is the older learners' superior cognitive development that gives them their rate advantage.

The greater efficiency of older learners over younger learners has been observed in relation to listening comprehension skills (Muñoz, 2003), phonetics (Fullana, 2006; García-Lecumberri & Gallardo, 2003), oral fluency (Mora, 2006), vocabulary (Miralpeix, 2006; Oller & Nagato, 1974; Singleton,

1998; Stankowski-Gratton, 1980), and writing (Celaya & Navés, 2009; Lasagabaster & Doiz, 2003; Torras, Navés, Celaya, & Pérez-Vidal, 2006), as well as in studies assessing participants' global L2 proficiency (Cenoz, 2002, 2003; García-Mayo, 2003).

While these results are in accordance with results in naturalistic contexts, no such parallelism has been found in FL settings in relation to the younger learners' ultimate attainment advantage observed in naturalistic language learning contexts. As seen above, the younger starters in the BAF project did not surpass older starters after 726 hours of instruction. Neither did the younger starters outperform older starters in a follow-up study that examined starting age effects after a longer period (2,400 hours distributed in 13.9 years) (Muñoz, 2011). It has been suggested that the younger learners' learning advantage, where observed, lies in their superiority at implicit learning, which is slow and needs massive exposure to the language (DeKeyser, 2000). In a naturalistic language learning context, young learners are provided with unlimited exposure, but not in an FL learning context. Therefore, this link between implicit learning and massive exposure may explain why young learners may be deprived of their learning advantage in FL contexts (Muñoz, 2006a). This explanation is supported by findings from a third type of learning context, that of school immersion. There, older learners have also been observed to be more efficient learners in more cognitively demanding language learning tasks. However, younger learners (who have had opportunities for implicit learning at an early age) show an advantage, but only in oral and aural skills (e.g., Hart & Lapkin, 1989; Lapkin, Swain, Kamin, & Hanna, 1980).

In short, the research available suggests that age effects on L2 acquisition are mediated by context. In a naturalistic setting, younger learners outscore older learners in the long run in spite of the older learners' initial advantage. In instructed settings, older learners seem to be faster and more efficient, particularly in the more cognitively demanding language learning tasks.

The Present Study

This study aims to compare children and adults in the two learning contexts of SA and AH so as to determine which learning context is more beneficial for different aspects of oral and written language production, and also which age group benefits the most from each context and in relation to which language dimensions. Previous studies have explored the potential benefits of different learning contexts or of different learning ages, but to our knowledge none has explored these issues in a unified comparative way using the same instruments

and methodology and targeting the same language aspects in the different groups defined by learning context and age. Specifically, a set of measures for fluency, complexity, and accuracy are used in the comparative analyses to probe language gains in oral and written production, because they have proven to show age-related differences in previous research (e.g., for oral fluency, Mora, 2006; for oral and written lexical diversity, Miralpeix, 2006; for written fluency, syntactic complexity, and accuracy, Torras et al., 2006, among others).

To achieve this aim, this study addresses the following overall research question:

To what extent do learning context (SA vs. AH) and age (children vs. adults) have an effect on the oral and written development of English as an L2, measured in terms of gains on fluency, lexical and syntactic complexity, and accuracy?

More specifically, we also asked:

Which learning context is more beneficial for the oral and written development of English as an L2?

Which age group benefits the most from the L2 learning experience in the two different contexts?

Method

Participants

The participants in this study were Spanish children and adults learning English L2 in two different contexts: an SA setting and an AH setting. The total number of participants in the four groups was 139. As seen in Table 1, out of the 73 children who participated in the study, 39 engaged in a 2- or 3-month SA experience and 34 stayed in the home country; they were all Catalan-Spanish bilinguals. Of the 66 adult participants, 46 of them, 25 of whom were English majors, studied abroad on an Erasmus scholarship for 2 or three months; most SA participants (92%) were Catalan-Spanish bilinguals. The AH adult group was also composed of Catalan-Spanish bilinguals majoring in English.¹ See Table 1 for information concerning previous experience of L2 (English) learning.

Although the length of stay (LoS) abroad was not exactly the same for all participants (either 2 or 3 months), no statistically significant differences were found for any measure in either oral or written production on the pretest nor on the posttest between participants' with an LoS of 2 months and those

Table 1 Participant characteristics

	Children		Adults	
	SA	AH	SA	AH
Age	10–11 ($M = 10.5$)		19–33 ($M = 20.9$)	
Age of Learning Onset	4.74		8.42	
Length of Exposure/Instruction	1,188 h +		1,620 h +	
Instructed Experience Only	38 (97.5%)	33 (97.05%)	20 (43.5%)	16 (80%)
Previous SA and Instructed Experience	1 (2.5%)	1 (2.95%)	26 (65.5%)	4 (20%)
<i>N</i>	39	34	46	20
Total = 139	73		66	

Note. SA = study abroad participants; AH = at-home participants.

Age and Age of Learning Onset are expressed in years.

with an LoS of 3 months (see Appendix S1 in the Supporting Information online). Therefore participants were grouped together according to their learning context (AH or SA) and age (children, adults), regardless of their LoS.

Different criteria were followed in the selection of participants for the SA experiences. In the case of the child participants, the SA programs were organized by their schools. One of the children's schools selected their participants on the basis of their overall academic achievement and behavior. In the other two schools, it was parents who made the decision to enroll their children for an SA experience. As a result, approximately 40% of the children were selected on the basis of their academic record, whereas the remaining 60% of child participants were not. In the case of the adult participants, no selection was made because of the lack of demand for Erasmus scholarships at the time. The absence of strong selection procedures in both cases may explain why no significant differences were observed on the pretest between the SA and AH children and between the SA and AH adults.

The SA children came from three different private schools (two boys' schools and one girls' school). These child participants went to Ireland as a group, where they were placed in regular schools with no other Catalan/Spanish-speaking classmates in the same classroom, or often even in the same school. They attended classes five hours a day. After classes, the teacher that accompanied them taught them Catalan and Spanish so that they did not fall behind on these languages. Those children who stayed in their AH school had English

classes 4 hours per week and attended science classes in English 2 hours per week, that is, 6 hours in total.

The Erasmus participants in the study went to the UK and Ireland. The amount of time that these participants spent in class varied a great deal and was determined by the number of credits they registered for. As mentioned before, the AH adult participants were an intact group of students who majored in English at a Catalan university.

Living arrangements while abroad were different for the two age groups. All SA children stayed with home-stay families who had children of similar ages and had no other foreigners living with them, whereas Erasmus students reported various living arrangements (dormitories, apartments and home-stay families) with and without L2-speaking interlocutors.

Readers will find further details about the participants' degree of L2 contact in Appendix S2 of the Supporting Information online, including frequency of instruction and amount and rate of oral and written production, respectively.

Procedure

This study has a pre-/posttest design. Child participants completed the instruments by which we elicited oral and written production (see next section) as a pretest at their schools 1 week before their departure to the host country. For scheduling reasons, the posttest administration of the same instruments was completed roughly 2 to 3 months later (depending on the SA length for each individual) either at the host country schools immediately prior to the pupils' return (28 out of the 39 SA child participants) or at their home school a week after their return (11 SA child participants). At the request of the schools, the children completed the written production test the day before the oral production test at both testing points; for this reason the number of child participants in the oral and written data varies slightly. In the case of the adults, for 25 out of the 46 SA adult students pretest and posttest data were collected at their host university the first day of the semester and the posttest was carried out 2 months later. For the remaining 21 adult SA students the data collection was carried out at their AH university; the pretest was completed the week before the participants' departure to the host country and the posttest a week after their return from the L2 country. Four researchers participated in the data collection following the same procedures and criteria.

Instruments

In the present study, written and oral data were collected twice (as a pretest and posttest), and questionnaire data were only collected at the time of the posttest.

Written Data

Participants were asked to write a composition entitled “My life: past, present and future expectations,” a familiar topic that was deemed suitable for both children and adults (see Muñoz, 2006b).² They were given 15 minutes to write the composition and were asked to write a minimum of seven lines.

Oral Data

After completing the written composition, participants were interviewed in English. The semi-structured interview began with a series of biographical questions. This interview served as a warmup, and lasted from 10 to 15 minutes. The interview led to a picture-elicited narrative task in which participants were shown a story that consisted of six pictures taken from Heaton (1966) and involving two children on a picnic and a dog (see Appendix S3 in the online Supporting Information for the pictures). This task had also proven to be suitable for both children and adults (see Muñoz, 2006b; Tavakoli & Foster, 2008). Participants were given 1 minute to examine the pictures and formulate the story prior to their retelling and recording. The length of the task varied, with adult learners taking less time to complete it.

Questionnaire

After the completion of the oral and written instruments on the posttest administration, participants completed a questionnaire adapted from the Language Contact Profile (LCP) (Freed et al., 2004). The questionnaire was administered in Catalan/Spanish and contained a series of biographical questions and questions concerning the participants’ amount and type of contact with the L2 and about the type of accommodation and patterns of interaction of those participants on an SA course. Because the LCP had only been used with adult participants, it was simplified in order to conform to children as well (see Appendix S4 in the Supporting Information). The researchers helped children to fill out the questionnaire to make sure that they understood the questions and to help them estimate the number of hours they interacted in English. The adult participants were given the questionnaire to complete on their own, but only 21 out of the 46 Erasmus students returned it.

Analysis: Oral and Written Production Measures and Reliability

The measures chosen to analyze the students’ written production in terms of fluency, lexical and syntactic complexity, and accuracy were among those measures considered most reliable by Wolfe-Quintero, Inagaki, and Kim (1998). Where appropriate, the same measures were used for the written and oral data

in order to make comparisons feasible. This was not the case with fluency: Whereas written fluency was examined in terms of words per T-unit³ (W/TU), oral fluency was examined by means of pruned⁴ syllables per minute (SPM), because words per T-unit has been claimed to be inexact for oral data (Griffiths, 1991). Lexical complexity was examined using Guiraud's Index of Lexical Richness (GUI): word types divided by the square root of the word tokens. Syntactic complexity was examined using the clauses per T-unit (CL/TU) complexity ratio. Finally, accuracy was examined by counting the errors per T-unit (ERR/TU), in which case lower scores in the posttest reflected participants' improvement.

The data were transcribed and coded using CLAN (MacWhinney, 2000). To compute inter-rater reliability, a researcher coded a random 15% of the transcriptions and this was compared with the coding by one of the authors of this article, who coded all the data. The agreement between the two researchers was 92.4%. Intra-rater reliability, on the basis of 15% of the data being recoded by the author, was slightly higher, reaching 95.4%.

Results

In this section, we present the comparative analyses we performed for intra-group change over time, inspected with paired samples *t* tests, and intergroup differences on posttest performances, inspected with multivariate analysis of covariance (MANCOVA), and we discuss both types of comparisons with respect to the influence of context, age, and their interaction, in turn. First, however, we offer the descriptive results on which the inferential analyses are based. The participants' performance on the pretest and posttest production data are shown in Tables 2 and 3, whereas Table 4 presents the average hours per week participants reported using the L2 across the four skills.⁵ As can be seen in Table 4, SA participants spent many more hours on average using the L2 than AH participants, and this difference is greater for speaking and listening than for reading and writing. The AH adult participants spent more time than the AH child participants on the four types of activities, and spent more hours reading and writing than any other group. Appendix S2 in the Supporting Information online provides further information concerning frequency of instruction and L2 contact, and on the amount and rate of oral and written production, respectively.

Intragroup Change

In order to ascertain gains over time for each group, paired samples *t* tests were performed for each of the four groups of participants to see whether there

Table 2 Means (and standard deviations) for pretest oral and written measures

		SA CHI	AH CHI	SA AD	AH AD
Oral	SPM	60.48 (33.98)	56.18 (41.25)	123.52 (28.39)	121.90 (31.42)
	GUI	3.86 (0.76)	3.48 (1.23)	5.69 (0.73)	5.14 (0.64)
	CL/TU	1.32 (0.40)	1.19 (0.60)	1.73 (0.26)	1.75 (0.38)
	ERR/TU	2.24 (1.09)	2.41 (1.27)	0.73 (0.53)	0.81 (0.61)
Written	W/TU	7.25 (2.02)	6.45 (2.04)	10.83 (2.34)	14.39 (5.45)
	GUI	4.89 (0.76)	4.72 (0.92)	7.30 (0.77)	7.08 (0.71)
	CL/TU	1.26 (0.24)	1.21 (0.27)	1.92 (0.39)	2.52 (0.62)
	ERR/TU	1.42 (0.77)	1.44 (1.17)	0.48 (0.32)	1.06 (0.45)

Note. SA = study abroad; AH = at home; CHI = children; AD = adults; SPM = pruned syllables per minute; GUI = Guiraud's Index of Lexical Richness; CL/TU = clauses per T-unit; ERR/TU = errors per T-unit; W/TU = words per T-unit.

were any significant gains between their performance on the pretest and the posttest administration. The alpha level was set at .006 to correct for multiple comparisons.

The *t* tests revealed that SA child participants scored significantly higher on the posttest than on the pretest in all the oral measures examined in the narrative task (SPM: $t(38) = -11.129, p = .000$; GUI: $t(36) = -6.501, p = .000$; CL/TU: $t(37) = -3.550, p = .001$; ERR/TU: $t(36) = 5.175, p = .000$). *t* tests also indicated that those same participants significantly improved in written lexical complexity, $t(37) = -3.822, p = .000$, and written accuracy, $t(37) = 3.180, p = .003$. In contrast, AH child participants did not experience any significant gains from the pre- to posttest administration. For the adults, paired samples *t* tests also revealed that the group of SA adults scored significantly higher in one out of the four oral variables examined, namely fluency, $t(45) = -7.507, p = .000$, but in none of the written variables. By comparison, the AH group of adults did not score significantly higher in any of the oral measures, but they did in written lexical complexity, $t(17) = -3.383, p = .004$.

Table 3 Means (and standard deviations) for posttest oral and written measures

		SA CHI	AH CHI	SA AD	AH AD
Oral	SPM	107.95 (36.95)	63.57 (41.73)	146.41 (31.37)	125.29 (34.59)
	GUI	4.43 (0.60)	3.35 (1.23)	5.93 (0.63)	5.36 (0.70)
	CL/TU	1.58 (0.40)	1.20 (0.45)	1.86 (0.32)	1.80 (0.47)
	ERR/TU	1.43 (0.87)	2.44 (1.18)	0.66 (0.39)	0.68 (0.43)
Written	W/TU	7.91 (1.55)	6.67 (1.86)	11.44 (2.28)	13.38 (2.13)
	GUI	5.44 (0.92)	4.99 (0.86)	7.62 (0.85)	7.73 (0.75)
	CL/TU	1.30 (0.25)	1.25 (0.27)	1.92 (0.36)	2.43 (0.37)
	ERR/TU	1.02 (0.63)	1.42 (0.79)	0.54 (0.35)	0.74 (0.69)

Note. SA = study abroad; AH = at home; CHI = children; AD = adults; SPM = pruned syllables per minute; GUI = Guiraud's Index of Lexical Richness; CL/TU = clauses per T-unit; ERR/TU = errors per T-unit; W/TU = words per T-unit.

Table 4 Descriptive statistics of participants' L2 contact across the four skills (average hours per week)

	SA CHI	AH CHI	SA AD	AH AD
Speaking	30.17 (9.23)	4.2 (2.3)	22.57 (11.66)	9.45 (7.36)
Reading	7.46 (6.9)	2.15 (2.15)	11 (8.63)	11.75 (8.87)
Listening	32.3 (8.4)	5.3 (3.8)	28 (9.89)	16.6 (9.17)
Writing	10.07 (8.22)	3.38 (2.05)	7.19 (6.67)	11 (7.78)
Total	80(8.18)	15.03(2.57)	68.76(9.21)	48.8(8.29)

Note. Standard deviations are in parentheses. SA = study abroad; AH = at home; CHI = children; AD = adults.

Intergroup Differences

Further analyses were conducted in order to examine intergroup differences in gains. As expected, pretests showed that the adult participants had a significantly higher level of proficiency in English than the child participants, as reflected in higher values in all the measures examined. This might have influenced the score gains of the dependent variable, as a number of SA studies have reported that participants with lower proficiency levels when they start the SA experience exhibit greater gains than more advanced participants (Brecht & Robinson, 1995; Dyson, 1988; Freed, 1995; Lapkin et al., 1980; Llanes & Muñoz, 2009; Marriott, 1995; Siegal, 1995). Therefore, in order to control for proficiency level, MANCOVA tests were performed with the scores of the participants on the posttest as the dependent variables, their scores on the pretest as the covariates, and learning context and age as the independent variables. The alpha level was set at .05. MANCOVA tests were carried out separately for the oral and written variables because sample sizes differed slightly due to a few children having missed one of the two tests that were completed on different days. Preliminary assumption testing was conducted to check for normality, linearity, outliers, and multicollinearity, with no serious violations noted. Table 5 summarizes the results of the analyses for the MANCOVA tests.

Learning Context

The MANCOVA test for the oral variables revealed that there were significant differences between the participants in both learning contexts, $F(4, 122) = 23.582$, $p = .000$, Wilks's Lambda = .564, $\eta^2 = .416$. It was observed in the follow-up tests that SA participants scored higher than those who remained at home in all measures analyzed, as the marginal means were higher for the group of SA participants than for the group of AH participants. Using Ferguson's (2009) criteria, the moderate effect sizes for the learning context variable on SPM ($\eta^2 = .296$) and GUI ($\eta^2 = .204$) suggest that this improvement in oral fluency and lexical complexity was quite uniform across the SA group. For oral syntactic complexity, the effect size was small but nevertheless significant (see Table 5). Next, the MANCOVA for the written measures also revealed significant differences between participants in the two learning contexts, $F(4, 123) = 3.939$, $p = .005$, Wilks's Lambda = .886, $\eta^2 = .114$. As can be seen in Table 5, only syntactic complexity reached statistical significance, with a small effect size, for which the AH setting was more advantageous.

To sum up, the MANCOVA results for learning context indicate that the SA context was more beneficial than the AH context for the improvement of oral skills, but not as much for improving writing skills, as measured in this study.

Table 5 MANCOVA follow-up test results for all variables

		LEARNING CONTEXT				
		<i>F</i>	<i>df</i>	<i>p</i>	η^2	Favorable
Oral	SPM	52.507	1	.000*	.296	SA
	GUI	31.944	1	.000*	.204	SA
	CL/TU	6.850	1	.010*	.052	SA
	ERR/TU	16.623	1	.000*	.117	SA
Written	W/TU	.054	1	.816	.000	ns
	GUI	.642	1	.424	.005	ns
	CL/TU	7.800	1	.006*	.058	AH
	ERR/TU	3.157	1	.078	.024	ns
		AGE				
		<i>F</i>	<i>df</i>	<i>p</i>	η^2	Favorable
Oral	SPM	.417	1	.520	.003	ns
	GUI	17.698	1	.000*	.124	Adults
	CL/TU	3.482	1	.064	.027	ns
	ERR/TU	.279	1	.598	.002	ns
Written	W/TU	19.548	1	.000*	.134	Adults
	GUI	13.368	1	.000*	.096	Adults
	CL/TU	14.563	1	.000*	.104	Adults
	ERR/TU	.182	1	.671	.001	ns
		LEARNING CONTEXT BY AGE				
		<i>F</i>	<i>df</i>	<i>p</i>	η^2	Favorable
Oral	SPM	4.007	1	.047*	.031	SA children
	GUI	7.578	1	.007*	.057	SA adults
	CL/TU	2.660	1	.105	.021	ns
	ERR/TU	19.092	1	.000*	.132	SA children
Written	W/TU	9.304	1	.003*	.069	AH adults
	GUI	2.604	1	.109	.020	ns
	CL/TU	9.962	1	.002*	.073	AH adults
	ERR/TU	1.679	1	.197	.013	ns

Note. SPM = pruned syllables per minute; GUI = Guiraud's Index of Lexical Richness; CL/TU = clauses per T-unit; ERR/TU = errors per T-unit; W/TU = words per T-unit; SA = study abroad; AH = at home; ns = not significant.

*Statistically significant at $\alpha < .05$. MANCOVA tests were carried out separately for the oral and written variables.

This finding is similar to the results obtained in the intragroup comparisons reported earlier.

Age

The MANCOVA tests indicated that there were a few significant differences between the two age groups, $F(4, 122) = 5.584, p = .000$, Wilks's Lambda = .845, $\eta^2 = .155$. As shown in Table 5, from among the oral measures, only the differences in scores in lexical complexity were significant and had a somewhat moderate effect size (GUI, $\eta^2 = .124$), and the estimated marginal means indicate that adults scored higher than children. The MANCOVA tests performed with the written variables showed a statistical difference between the two age groups, $F(4, 123) = 7.425, p = .000$, Wilks's Lambda = .806, $\eta^2 = .194$. It can be seen in Table 5 that measures were significantly higher for adults in fluency, lexical complexity, and syntactic complexity, with rather moderate effects ($\eta^2 = .134, .096, .104$, respectively).

In sum, although the comparisons of the results obtained earlier in the within-group analyses show that child participants obtained significant gains during the SA experience in more measures than the adult participants and that the adults benefited more from the AH instruction than the child participants did, the present comparisons between groups of participants indicate that the adults' gains were higher than the children's in all the measures that turned out to be statistically significant, which were primarily written measures.

Learning Context and Age

The results of the MANCOVA tests concerning the interaction between learning context and age for the oral variables indicated that the interaction was significant, $F(4, 122) = 7.875, p = .000$, Wilks's Lambda = .795, $\eta^2 = .205$. The follow-up analyses (shown in Table 5) revealed statistically significant values for fluency, lexical complexity, and accuracy, with rather small effects ($\eta^2 = .031, .057, \text{ and } .132$, respectively). The estimated marginal means indicated that the SA children had the highest gains in oral fluency (SPM), followed by the SA adults, AH adults, and AH children, respectively. As for oral lexical complexity (GUI), the estimated marginal means showed that the SA adults had the highest gains, followed by the AH adults, SA children, and AH children, respectively. With respect to accuracy (ERR/TU), the SA children had the highest gains, followed by AH adults, SA adults, and AH children, respectively. The results of the MANCOVA tests for the written variables also indicated that the interaction between the two independent variables was significant, $F(4, 123) = 4.209$,

$p = .003$, Wilks's Lambda = .880, $\eta^2 = .120$, and as summarized in Table 5 the follow-up analyses show that the interaction between learning context and age was significant for fluency and syntactic complexity, both with a small to medium effect size. In both cases the AH adult participants presented the highest gains, followed by the SA adults, SA children, and AH children, in that order.

In brief, comparisons between groups revealed that SA child participants presented the highest gains in oral fluency and accuracy, SA adults had the highest gains in oral lexical complexity, and AH adults had the highest gains in written fluency and syntactic complexity. Thus the SA setting seems to be more beneficial for children in terms of the improvement of oral skills, whereas the AH context seems to foster the development of writing skills, especially for adults.

Discussion

Learning Context

The current results showed that the SA context was more beneficial for L2 improvement than the AH context, particularly in terms of the participants' oral skills. This finding is in line with many previous SA studies that have also shown that spending some time abroad is beneficial for the improvement of oral skills.

This finding could be at least partly explained by the role of practice in L2 learning and, in particular, by Anderson's ACT* Theory (Anderson, 1983, 1992, 1993), as supported by DeKeyser (2007), which distinguishes three different types of knowledge: declarative, procedural, and automatic. Participants in this study may have enrolled in the SA experience with some previous knowledge of the L2 (declarative knowledge). Once abroad, due to the multiple opportunities to practice the L2, they may have proceduralized their declarative knowledge and, after numerous hours of practice, they may have automatized certain aspects of the L2. Automatization could explain why on the posttest SA participants took less time to carry out the oral narrative task and why they wrote many more words within the same amount of allotted time for the composition (as seen in Appendix S5 of the Supporting Information).

In contrast, participants who stayed at home did not have as many opportunities to practice the L2, particularly as far as oral practice is concerned, and this may have resulted in their having lower gains than participants abroad, especially in oral production measures. This explanation is compatible with the Output Hypothesis (Swain, 1985) and the Interaction

Hypothesis (Long, 1981), which highlight the benefits of practice in the L2 and of negotiation of meaning in meaning-based exchanges, respectively. As revealed by the answers to the questionnaire shown in Appendix S2 in the on-line Supporting Information, the SA context provided participants with more frequent possibilities for output and meaningful interaction, as well as higher-quality input from a higher number of (expert or native speaker) interlocutors.

By comparison to oral skills, the SA context did not enhance learners' writing skills to any great extent. One may turn to practice again for an explanation, as SA learners reported very limited practice in L2 writing while abroad. Certainly the huge difference recorded in Table 4 between time spent writing or reading as opposed to listening to or speaking in the L2 confirms that these skills received relatively little attention in the SA context.

Age

First, as regards the oral variables in this study, the statistical analyses showed that, after 2 or 3 months of either SA or AH, adults experienced greater gains than children in lexical complexity, but the variable of age did not yield significant effects in relation to oral fluency, syntactic complexity, or accuracy. The finding for lexical complexity supports previous findings concerning age and vocabulary acquisition in short-term naturalistic settings (e.g., Snow & Hoefnagel-Hohle, 1978) and in FL settings (see studies cited in our review of the existent literature). However, the lack of significant differences in relation to the other oral measures might be due to the fact that the data were obtained by means of a picture-elicited narrative task, which was not very cognitively demanding. Research suggests that in cognitively demanding tasks adults perform better than children due to their more advanced cognitive abilities (Cummins, 1980; Ekstrand, 1976; Ervin-Tripp, 1974; Muñoz, 2006a). Moreover, the task was context embedded and hence unrelated to the participants' literacy in their L1 and L2 (Cummins, 1983). The adults' L1 literacy skills may have been positively transferred to certain aspects of written tasks but not so much to the basic oral skills required for this simple oral narrative task (Cummins, 1978).

As far as the influence of age on L2 writing pre- and posttest performance, the adults' gains surpassed the children's in all the measures examined with the exception of accuracy. This finding is consistent with previous age-related studies in instructed settings (e.g., Muñoz, 2006b), which found that older participants' writing development in English as an L2 was superior to that of younger participants after the same number of hours of instruction, despite the later age of onset of learning of the former. A plausible explanation lies

in the older learners' more developed cognitive skills and L1 literacy. L2 writing, being a "bilingual event" (Manchón, Murphy & Roca, 2007, p. 165) is associated with L1 writing ability (Cumming, 1989).

Learning Context and Age

This study also provides findings concerning the possible interaction between learning context and age, namely, an advantage over the remaining groups for SA children as far as oral fluency and accuracy are concerned, for SA adults in oral lexical complexity and for AH adults in writing skills. It is noteworthy that children who spent some time abroad experienced twice as many gains in oral fluency as adults abroad and that the SA children's gains were so large after such a relatively short time abroad. As suggested above, the picture-elicited narrative task was not very cognitively demanding, which may explain why the older learners did not have a general task-related advantage. On the other hand, the SA adults' greater gains in oral lexical complexity may be associated with the adults' more developed cognitive skills and larger L1 lexicon, which facilitate some positive transfer to L2 learning.

Other factors such as the participants' amount, type, and quality of L2 contact while abroad as well as the amount of instruction received could also contribute to explaining the SA children's faster development in oral skills. As shown in Table 4, children who went abroad reported practicing English oral skills (speaking and listening) more than adults who went abroad. They also received many more hours of instruction in the L2 than any of the other groups (see Appendix S2 in the online Supporting Information). Moreover, the SA adults used the L2 very often among non-native speakers of English, whereas the SA children used it almost exclusively with native English speakers, which may have provided them with higher-quality input (see Appendix S2 for details).

It is claimed that children in a naturalistic context learn languages largely implicitly and that this context fosters implicit learning more than explicit learning (DeKeyser, 2000, 2003). It is also argued that oral variables tap into implicit knowledge rather than into explicit knowledge, given that they are usually elicited via immediate, real-time tasks and participants do not have time to monitor their language production (Ellis, 2005). This could explain why the only two measures in which children who went abroad showed superior gains over adults are oral measures. Because implicit mechanisms are known to be more efficient than explicit mechanisms, because implicit knowledge is retrieved more quickly and effortlessly, this would not only explain the superiority of

children abroad in syllables per minute (oral fluency) but also in errors per T-unit (oral accuracy). In contrast, the more explicit mechanisms that characterize adults' learning are slower because they require some thinking prior to speaking (Ellis, 2004; Mathews et al., 1989). Therefore, the fact that the SA children in this investigation spoke faster and made fewer mistakes seems to suggest that they experienced a great deal of implicit learning through the L2 contacts afforded by the SA context.

The interaction between learning context and age observed in relation to the written measures yielded different results. Specifically, the group of AH adults showed significantly higher gains in words per T-unit (written fluency) and clauses per T-unit (written syntactic complexity). As commented on above, the superiority of adults over children in writing skills is probably due to their more developed cognitive skills and literacy in their L1, given that the writing activity that participants were asked to carry out is rather context free (Cummins, 1983). The fact that it was AH adults rather than SA adults who experienced greater gains in these written measures could be explained by the influence of practice, because AH adult participants practiced writing in English much more than SA adult participants. The fact that all adult participants in the AH context were English majors implies that they were required to read and write in English quite often and that they paid great attention to accuracy. However, as Collentine (2004) states, this advantage of the AH group in terms of syntactic complexity may have been at the expense of other variables such as lexical complexity or accuracy.

Conclusion

In sum, the present study revealed that, while the SA learning context is clearly superior to the AH context, the answer as to which age group benefits the most from the L2 learning experience in each context is not simple. In terms of relative gains, it could be posited that children benefited more than adults from the SA context because it was never the case that AH children scored higher than SA children in any of the measures. What is more, the difference between SA and AH children was much larger than the difference between SA and AH adults. In terms of absolute gains, however, it was found that the groups of adults, both SA and AH participants, outscored the groups of children. Regarding the interaction between learning context and age, a distinction needs to be made between oral and written measures. As far as oral measures are concerned, the SA context still seems to be more advantageous for children

because they were superior in two out of the three significant values that were obtained in the analyses. On the other hand, concerning written measures, it was found that the AH adults outscored the remaining groups in the two variables that yielded significant values in the analysis of the interaction between learning context and age.

Taken as a whole, these results contributed by this study shed light on two important issues. First, the comparative analyses indicate that the SA context is more beneficial than the AH context, particularly for the improvement of participants' L2 oral skills. Second, as far as the age factor is concerned, the results provide further evidence for the argument that age effects are mediated by context. Specifically, the results suggest that children who go abroad benefit more from the experience than adults, which reflects the finding that younger learners have an advantage in naturalistic settings because of their superior ability to learn implicitly. On the other hand, although the period of 2 or 3 months of intense exposure is enough for this age-related advantage to emerge, the fact that the children's absolute gains are not as high as those of the adult group suggests that children would greatly benefit from an even longer period of intense exposure. In contrast, the results also show that adults benefit more from the AH setting than children, which reflects the finding that older learners have an advantage in typical instructed settings. However, a word of caution is needed here because the results concerning the group of adults, students majoring in English, may not be generalizable to other adult groups. Also, the assumptions based on their patterns of L2 contact may not be accurate enough because the questionnaire was only returned by approximately half of the adult SA participants. Likewise, a general limitation of this study concerns the possible role of self-selection of high academic performance in some of the SA children (40%, all from the same school), which may have affected the results of participants who went abroad. Further research could also be conducted with less controlled data, such as that from the warmup part of the interview, and in other areas unexplored by this study. This is the case for L2 pronunciation, in which children in a naturalistic language learning setting or in a school immersion setting tend to outperform older learners in the long run. Moreover, additional research is needed regarding the long-term effects of the gains that emerge as a result of an SA experience, because the duration of these effects is unclear.

An important pedagogical implication could be drawn from the findings of this study. At present, SA programs mainly target adults and adolescents, and in the exceptional cases when children can study abroad, it is usually

through private, expensive institutions. If further research confirms the findings that emerge from this investigation, state-funded schools could offer exchange programs so that a larger number of children could afford the opportunity to improve their L2 at a time in their life when they can benefit greatly from intense exposure to the target language.

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Notes

- 1 Since both child and adult participants had started the study of English before puberty, no differences exist that are relevant to the critical period hypothesis proper.
- 2 The specific instruction for children was: “Write a composition about your life and try to write things that you did or liked in the past, in the present and in the future. You should write a minimum of seven lines.”
- 3 Hunt (1965, p. 20) defines the T-unit as “one main clause with all subordinate clauses attached to it.”
- 4 Pruned syllables did not include false starts, repetitions, self-corrections, words in a language other than English, and unfinished sentences.
- 5 Following Freed et al. (2004), the number of days reported to have practiced a specific skill was multiplied by the high number of each range (when exact numbers were not provided).

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix S1. Statistical Results for Length of Stay (LoS) Abroad on the Pre- and Posttests.

Appendix S2. Information Extracted from the Questionnaire.

Appendix S3. Oral Narrative Pictures (from Heaton, 1966).

Appendix S4. L2 Contact Questionnaire.

Appendix S5. Time Completion for Oral Performance and Amount of Production for Oral and Written Performance.