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Attentional Capacity and Written Production in English (L1 and L2) and Spanish (L1) within the Framework of Erasmus+ Project

1. Introduction

The development of written competence is a complex process that requires explicit and formal instruction, as well as the efficient coordination of high- and low-level skills such as generating, organising and structuring ideas, revising, editing, paying attention to linguistic forms and punctuation, among others (Kellogg 2008; Olive/Kellogg 2002). This coordination is essential, as writing is a recursive, nonlinear process; for example, editing is not the final stage of the writing process but, rather, the beginning of another cycle of thinking-composing-reviewing-editing, or just an intermedium step in the continuum that goes from the initial "idea" to the "final product" of writing.

If mastering writing skills in the first language (L1) is a complex process, it is reasonable to believe that learning to write efficiently in a second language (L2) might turn into a tedious, time-consuming and extremely demanding task, especially for L2 novice writers. These writers usually lack genre-specific and vocabulary knowledge (i.e., difficulties in finding the right words to convey a coherent message) and have limited exposure to L2 written texts. Moreover, writing instructions and practices received in the classroom may not be adequately adapted to their needs. Nevertheless, writing quality texts in L2 is a crucial prerequisite for academic achievement, thus, an ability that must be taught and fostered from an early age. The present study aims to examine the difficulties that young children encounter when they write in their L1 and L2, focusing particularly on the relationship between

children's attentional capacity and several linguistic dimensions of their written productions.

2. **Writing as a high cognitive load task**

Research carried out in the fields of Psychology and Second Language Acquisition provides support for the idea that writing is not just a matter of having a good command of the language. It is also determined by phonological capacities and visuospatial skills that are necessary for planning conceptual and figurative content, dividing the text into thematic blocks, maintaining a representation of the page and its layout, and detecting and monitoring errors (Baddeley 2003; Olive/Passerault 2012). Several studies have shown that writing imposes high attentional demands and cognitive load on learners' working memory capacity (Kellogg 2001, 2004; Kellogg/Olive/Piolat 2007; Mavrou 2018a, 2018b; Olive/Kellogg/Piolat 2008; Ransdell/Levy/Kellogg 2002; Révész/ Michel/ Lee 2017) both in child and adult populations (Bourdin/Fayol 1994, 2002; Glynn/Britton/Muth/Dogan 1982; Grabowski 2005). The more demanding the task, the more attentional resources will be necessary in order to carry it out successfully. In Kellogg's (2008: 22) words: "Advanced writing skills require systematic training as well as instruction so that executive attention can successfully coordinate multiple writing processes and representations".

In the case of children, cognitive load is due, among other factors, to the lack of automatization of low-level processes (Bourdin/Fayol 1994; Fayol/Foulin/Maggio/Lété 2012; Grabowski 2005). According to Fayol *et al.* (2012): (a) speed and flexibility of writing processes increase with age and schooling; (b) a high degree of automatization of low-level processes allows for a more efficient distribution and management of writing components (see also Olive/Kellogg 2002); (c) in the case of children, the time allocated to transcription hinders the processes of generation and organisation of ideas. There is also a growing body of studies suggesting that high levels of distractibility, inattentive behaviour, low working

memory spans, and poor executive functioning are often associated to learning difficulties and poor academic performance and/or progress in several subjects, including writing (Alloway *et al.* 2005; Berninger *et al.* 2010; Bourke/Adams 2003; Gathercole *et al.* 2008; Gathercole/Lamont/Alloway 2006; Pickering/Gathercole 2004). Moreover, recent evidence from the field of Neuroscience points to the superiority of handwriting over typewriting when it comes to several cognitive capacities (letter recognition, reading, memory) and to the benefits derived from providing children with training of sensory-motor skills (Cerni/Velay/Alario/Vaugoyeau/Longcamp 2016; Mangen/Balsvik 2016; Vinci-Booher/James/James 2016).

As the process of literacy acquisition evolves, children become more aware of how to employ their cognitive and linguistic skills in order to achieve an efficient coordination of writing processes. Undoubtedly, instructional settings and practice opportunities are core elements in acquiring the multiple skills that characterise an expert writer.

3. The CLIL Approach

The implementation of the Content and Language Integrated Learning (CLIL) approach, which is now a common practice in numerous schools, relies on a solid background in most European countries. The advent of the approach dates back to the mid-nineties and was driven by the European linguistic policy of that decade, aiming –among other goals addressed to European citizens– to promote language learning and linguistic proficiency, to favour mobilities throughout Europe, and to achieve a broader internationalisation. The CLIL approach has been characterised by a clear variation depending, among other factors, on country-related features, such as "the specific educational system and (…) the wider socio-linguistic context in which the approach is embedded" (Wolff 2009: 548). However, certain common features in its implementation are shared by most educational systems, mainly in

primary education (Pérez-Cañado 2012): (a) the CLIL provision is usually part of the mainstream education; (b) the target language (mostly English, followed by French and German) is present in the curriculum of the content subjects; (c) the scope of the subjects taught through the additional languages is limited, favouring creative and environmental subjects in primary education (Marsh 2013), and taking into consideration the different cognitive demands each subject requires (Pavón Vázquez 2018).

Initially, CLIL was conceived as a "dual-focused educational approach in which an additional language is used for the learning and teaching of both content *and* language" (Coyle/Hood/Marsh 2010: 1). From the outset, the term CLIL was considered as an umbrella term encompassing, as outlined above, context-bound varieties throughout Europe, but also common theoretical frameworks, linking cognition to language, upon which the approach was built. One of these theoretical bases is the 4 Cs Framework, which "integrates four contextualized building blocks: content (subject matter), communication (language learning and using), cognition (learning and thinking processes) and culture (developing intercultural understanding and social citizenship)" (Coyle/Hood/Marsh 2010: 41). As for cognition within the CLIL approach, teachers and academic staff are encouraged to analyse cognitive processes and mechanisms underlying language acquisition and to adjust their instructional and linguistic practices so that children are able to understand and assimilate the contents to be taught. In CLIL contexts, cognition also refers to the way in which learners engage in the process of language understanding by developing personal paths. According to Coyle, Hood and Marsh (2010), this fact led to the consideration of the acronym CLIL not as a dual-focused approach, but rather as a triple focus concept where students' cognition goes hand in hand with the content and language objectives.

Cognitive challenges in CLIL contexts are high because of the considerable effort required to process and produce information through an additional language (Mehisto 2008).

Due to this extra cognitive demand (Halbach 2009), the CLIL approach emphasises the importance of developing thinking skills, usually from *information processing* –specific thinking skills or low-order thinking skills (LOTS)– to *abstract thinking* or high-order thinking skills (HOTS) following Bloom's Taxonomy (1956) in its revised version (Anderson *et al*. 2001). According to this taxonomy, the hierarchical organisation of cognitive processes throughout a continuum that goes from LOTS to HOTS is another cornerstone in the theoretical background of CLIL.

Moreover, thinking skills are closely linked to language, mainly because of the indispensable use of the Cognitive Academic Language Proficiency (CALP) required in academic settings (Cummins 1984). CALP is the necessary linguistic knowledge in order to face cognitively demanding situations that imply interpreting, inferring, or evaluating, among others. This kind of linguistic knowledge is also considered as more "cognitively taxing" than the basic interpersonal communication skills or BICS (Lorenzo/Rodríguez 2014) required mostly in day-to-day social interactions.

To sum up, cognition is intrinsically built in the theoretical framework of the CLIL approach and it is closely linked to both content and language. To date, however, little is known about how CLIL settings influence learners' performance in cognitively demanding and complex tasks. Thus, more research is needed in order to explore the possible benefits of CALP in CLIL contexts (Lorenzo/Rodríguez 2014) and to examine if these contexts "may hold the potential for positive cognitive gains" as argued by Lorenzo, Casal and Moore (2010: 420).

4. **Writing in CLIL settings**

Research on L2 learning in CLIL contexts has progressed at a very fast pace during the last fifteen years. Several studies have corroborated that CLIL students often outperform their

non-CLIL peers in oral skills, yet the results obtained regarding writing are somewhat contradictory (Celestén Pérez/Basse 2015; Dalton-Puffer 2011; Lasagabaster 2008; Ruiz de Zarobe 2008, among others). This observation may not be surprising, since the CLIL approach prioritises oral production, communicative fluency, and content learning over written expression and practice. This might also be the reason why errors are frequently overlooked in content classes, and without regular L2 classes these errors may never be identified and corrected (Pica 2002).

Focusing on writing skills, benefits of the CLIL approach have been found mainly in the use of complex vocabulary and morphosyntactic structures (Dalton-Puffer 2011), fluency (Navés/Victori 2010), and lexical richness (Jiménez Catalán/Ruiz de Zarobe/Cenoz 2006). On the other hand, linguistic dimensions beyond sentence level, such as cohesion, coherence, and discourse structuring, are not always fostered by CLIL experiences (Dalton-Puffer 2011). This is in line with the observation of Nieto Moreno de Diezmas (2016: 84) that "not all the linguistic aspects are developed to the same extent", and fit well with evidence suggesting that other variables –beyond instructional settings– should be considered in order to account for individual differences in children's writing performance (e.g., cognitive variables and emotional factors that are intrinsically linked to any type of learning).

Regarding linguistic accuracy, students may be aware of the difficulties they have to face when writing in a L2 and, consequently, may try to monitor their production focusing more on form than on meaning (Krashen 1982). Recent evidence is now available on how CLIL contexts affect L2 writing errors. For instance, Celestén Pérez and Basse (2015), who compared written productions of CLIL and non-CLIL students, found a similar number of grammatical errors. According to the authors, this finding "implies that more focus on form approach would be necessary in bilingual contexts because certain aspects of language are not acquired incidentally" (Celestén Pérez/Basse 2015: 16). Nieto Moreno de Diezmas

(2016) found a higher degree of accuracy in written productions of non-CLIL compared to CLIL students. This result could be attributed to the fact that, contrary to CLIL contexts, regular L2 classes often prioritise form over meaning. It would also help to explain why CLIL contexts are more "natural-like" compared to foreign language classes (Dalton-Puffer/Smit 2007) and why in these contexts the L2 is mainly acquired rather than learnt.

The above findings deserve further attention, especially when considering that the improvement of *global* L2 proficiency within CLIL contexts was one of the initial key goals for the European Commission. Although there seems to be a consensus on the positive effects of CLIL teaching on learners' communicative competence in L2, attending regular classes may be necessary to improve L2 writing skills. In agreement with Pica, Rumlich (2016: 449) states that in Germany "regular EFL classes are the driving force behind the development of students' (productive) general EFL proficiency (...) Consequently it would be counterproductive (...) to discard regular EFL classes for the sake of substituting them with additional CLIL lessons". According to Rumlich (2016), these observations are context-bound and need to be complemented in the future with more research conducted in different learning contexts, for example, the Spanish educational system, where bilingual schools have become the norm and target students from very different linguistic and cultural backgrounds.

Finally, to our knowledge, the relationship between L2 writing and attentional capacity in CLIL settings is far for clear. We could speculate that cognitive challenges imposed by CLIL contexts may boost students' abilities, both cognitive and linguistic. On the other hand, attentional capacity can be employed in many different ways depending on individual-, context- or task-related variables. For young children, L2 oral tasks seem much easier than writing tasks, which require instruction, practice, different types of knowledge and, obviously, a certain degree of cognitive maturity. CLIL contexts may promote some of these aspects, but not all.

5. Methodology

Drawing on the above literature review on the link between cognition, on the one hand, and CLIL contexts and writing, on the other, the current study aimed to examine the relationship between attentional capacity and written production of a group of children, native speakers of English and native speakers of Spanish that were learning English as a L2. To this end, the following research questions were established:

RQ1. Is there a relationship between children's attentional capacity and specific features of their written productions (i.e., number of words, number of errors, number of lexical types and tokens)?

RQ2. Are there differences to the aforementioned linguistic aspects between L1 and L2 written productions?

RQ3. What are the most common error types these children make in their written productions?

5.1. Participants and context of the study

The present study is framed within the ERASMUS+ Project [2016-1-ES01- KA201-025491], which took place between July 2016 and October 2018. Primary students from Riga (Latvia), Altamura (Italy), Lorca (Spain), Exeter and Honiton (United Kingdom) experienced three one-week mobilities to the cities involved in the project in order to improve their linguistic and intercultural competences. Exchanges took place through both academic years, and students had the chance to attend CLIL lessons and to participate in cultural, ludic, and sports activities.

Data gathered for this study derived from 47 children, 24 females and 23 males, aged 10 and 11 years, except for a female participant from the United Kingdom who was 12 years old. Thirty-one children were Spanish, had an A2 level in English according to the Common

European Framework of Reference for Languages (CEFR; Council of Europe 2001), and attended Andrés García Soler School (Lorca, Spain), while 16 children were British from Redhills Primary School and Offwell Primary School (Devon, United Kingdom). All three schools are state schools.

The educational context regarding L2 learning and teaching is very different for these children. British students attend monolingual schools with few compulsory French classes per week. Their learning outcomes are not oriented towards a high communicative competence in L2, but rather towards the acquisition of basic linguistic knowledge and resources. Spanish students, on the other hand, attend a bilingual school in the Murcia Region, which follows the Curriculum for Bilingual Schools (BORM 2017). Schools that implement the CLIL approach include in their curriculum the teaching of at least one content subject through an additional language, as well as different degrees of immersion in this language (basic, medium or high). In schools that follow a high immersion programme, exposure to L2 starts at 3 years old and children are taught up to three content subjects through the additional language, while at the end of primary education they start learning another foreign language, usually German or French. Andrés García Soler School (Lorca) follows a medium immersion programme, which involves 6.5 hours of instruction in English per week (English/L2 and Sciences). This type of immersion, broadly extended in Spain and with certain variations within bilingual and plurilingual schools, is believed to promote the acquisition and improvement of communicative competences in several languages.

5.2. Data collection tasks

Data collection was carried out by means of the following tasks:

(1) A brief questionnaire. The purpose of this questionnaire was to gather information about children's genre and age, the number of languages they spoke, the age they

started to learn them, and the countries they had lived in. The questionnaire was designed and delivered in Spanish and English versions for Spanish and British children respectively.

(2) A narrative writing task. Narratives are useful tools frequently employed in empirical studies examining short-term experiences abroad (Elliot 2015), because they help to gain insight into students' feelings and thoughts on the immersion. Moreover, at the A2 level, learners should be able to describe basic needs, personal events, familiar places, hobbies, work, etc., using simple connectors (such us *and*, *but*, *because*) to link their sentences (Council of Europe 2001). Based on these considerations, we asked children to write a short composition about the first day of their mobility experience. The instructions were as follows: How was your first day at school? Have you met children from other countries? How many? What do you know about their countries? Thirty-four children (18 Spanish and 16 British) carried out the task in their L1, while the remaining 13 Spanish children performed it in English/L2. Time allotted to complete the task was approximately half an hour. All texts were later analysed in terms of number of words, number of errors (grammatical, lexical, and spelling errors), and number of lexical tokens and types.

(3) CARAS-R Differences Perception Test (Thurstone/Yela 2012). This test measures children's perceptive and attentional capacity and must be completed in 3 minutes. It consists of 60 graphic elements (figures), each one made up by three schematic drawings representing faces with elementary lines for mouth, eyebrows, and hair. Two out of three faces are identical, and the subject's task is to find out which one of the three faces [*caras*] is different and cross it out. Children's performance in CARAS-R was assessed by taking in account (a) the total number of correct answers (CARAS R), and (b) the total number of correct answers after subtracting the total number of errors, which provides a more precise indicator of child's actual performance (CARAS R-C). The test has shown positive correlations with children's performance in subjects such as language and mathematics

(Repáraz/Peralta/Narbona 1996). A high score indicates that the subject rapidly processes details of visual stimuli and his/her judgements are precise, while a low score shows poor visual perceptual and attentional skills towards details.

5.3. *Data collection procedure*

Data collection took place in February and June 2017 during the exchange programmes in Spain and in the United Kingdom respectively. Children performed the writing task as part of their lessons. The instructions were given by the researchers and reinforced by the children's teachers, who provided them with explanations and guidance on what they had to do. CARAS-R was administered in a similar way, with strict control of the time spent on performing the test (3 minutes).

6. **Results**

Table 1 summarises descriptive statistics (means, standard deviations, minimum and maximum values) for the variables of the study: scores in CARAS-R, number of words, number of errors, and number of lexical tokens and types.

		N	Mean	Std. deviation	Minimum	Maximum
Caras R	Spanish/L1	18	42.39	7.09	28	56
	English/L1	16	36.69	11.92	17	59
	English/L2	13	52.77	7.77	37	59
	Total	47	43.32	11.02	17	59
Caras R-C	Spanish/L1	18	40.33	7.75	26	55
	English/L1	16	34.88	11.72	17	58
	English/L2	13	51.31	7.04	37	58
	Total	47	41.51	11.08	17	58
Words	Spanish/L1	18	48.11	20.17	21	103
	English/L1	16	51.06	21.98	22	94
	English/L2	13	56.00	27.79	30	136
	Total	47	51.30	22.79	21	136
Errors	Spanish/L1	18	1.67	1.75	0	5
	English/L1	16	2.69	3.01	0	11
	English/L2	13	8.62	4.05	3	17
	Total	47	3.94	4.14	0	17
Lexical tokens	Spanish/L1	18	35.94	14.90	18	77
	English/L1	16	43.38	18.42	19	81
	English/L2	13	45.00	21.51	22	104
	Total	47	40.98	18.16	18	104
Lexical types	Spanish/L1	18	26.94	9.42	14	56
	English/L1	16	30.81	11.10	14	54
	English/L2	13	29.00	13.30	14	67
	Total	47	28.83	11.04	14	67

Table 1. Descriptive Statistics.

Initially, Pearson's Product-Moment correlations between the variables of the study were computed considering the total number of participants (*N*=47). As shown in Table 2, no significant correlations were found between children's perceptive and attentional capacity, as assessed by CARAS-R, and the linguistic measures employed in the study. On the other hand, positive and statistically significant correlations were revealed between number of errors and both number of words (*r*=.446, *p*=.002) and number of lexical words (*r*=.476, *p*=.002), that is, children who wrote longer compositions, and consequently used a higher number of lexical tokens, tended to make more errors.

In order to shed more light on the above results, we computed the same correlations within each group of participants considering the language in which they performed the writing task. A summary of the results can be found in Table 3 (Spanish/L1), Table 4 (English/L1), and Table 5 (English/L2). As can be seen, most correlation patterns revealed in the whole group remained quite similar in the Spanish/L1 group. In the English/L1 group,

correlations between number of errors and number of words and lexical tokens slightly decreased. Moreover, in the English/L2 group, some negative correlations, though not significant at the .05 level, were observed between children's perceptive and attentional capacity and number of errors (r=-.339 and r=-.302 for CARAS R score and CARAS R-C score respectively) and words (r=-.459 and r=-.467 for CARAS R score and CARAS R-C score respectively). In other words, children with higher perceptive and attentional capacity tended to make fewer errors, although their compositions were shorter. In the same group, an interesting trade-off was also detected between accuracy (number of errors) and fluency (number of words) (r=.646, p=.017).

	Caras R	Caras R-C	Words	Errors	Lexical tokens
Caras R	1				
Caras R-C	.985**	1			
Words	-.091	-.029	1		
Errors	.198	.235	.446**	1	
Lexical tokens	-.092	-.027	.983**	.476**	
Lexical types	-.146	-.085	.962**	.368*	.964**

*p < .05, **p < .01

Table 2. Correlations Between Attentional Capacity and Linguistic Aspects of Written Production.

	Caras R	Caras R-C	Words	Errors	Lexical tokens
Caras R	1				
Caras R-C	.957**	1			
Words	-.161	-.038	1		
Errors	-.264	-.208	.506*	1	
Lexical tokens	-.142	-.020	.991**	.541*	
Lexical types	-.160	-.035	.967**	.506*	.972**

*p < .05, **p < .01

Table 3. Correlations Between Attentional Capacity and Linguistic Aspects of Written Production (Spanish/L1).

	Caras R	Caras R-C	Words	Errors	Lexical tokens
Caras R	1				
Caras R-C	.988**	1			
Words	-.031	.045	1		
Errors	-.273	-.245	.337	1	
Lexical tokens	-.025	.052	.995**	.341	
Lexical types	.014	.090	.974**	.312	-.977**

*p < .05, **p < .01

Table 4. Correlations Between Attentional Capacity and Linguistic Aspects of Written Production (English/L1)

	Caras R	Caras R-C	Words	Errors	Lexical tokens
Caras R	1				
Caras R-C	.989**	1			
Words	-.459	-.467	1		
Errors	-.339	-.302	.646*	1	
Lexical tokens	-.418	-.411	.988**	.688*	
Lexical types	-.410	-.409	.978**	.660*	.967**

*$p < .05$, **$p < .01$

Table 5. Correlations Between Attentional Capacity and Linguistic Aspects of Written Production (English/L2).

Then, the Kruskal-Wallis test was computed (Table 6) in order to examine possible differences between the three groups regarding the linguistic measures employed in the study. As expected, the results showed a statistically significant difference in the number of errors (H=22.65, $p < .001$), being learners of English as a L2 those who made more writing errors compared to their peers who performed the task in their L1.

	Words	Errors	Lexical tokens	Lexical types
Chi-Square	.899	22.646	2.471	1.212
df	2	2	2	2
Asymp. Sig.	.638	$p < .001$	.291	.546

Table 6. Differences Between Spanish/L1, English/L1, and English/L2 Groups Regarding Linguistic Aspects of Written Production.

Finally, Table 7 summarises the most common errors made by children in their L1 and L2 texts. Spanish/L1 young writers made several spelling errors related to the placement of the accent marks (mostly omissions), but these errors were not considered in the analysis neither are presented here. Other error types found in the texts of this group can be classified into the following categories: letter omission (especially of the Spanish silent *h*), letter addition, and mixing up letters that sound the same (*y* and *ll*) or almost the same when pronouncing certain words (*inposible**-*imposible*). In the English/L1 group, writing errors were of a similar nature: letter omission (*hoter**, *traveld**), letter addition (*foods**), and letter substitution (*ready** instead of *really*). On the other hand, most writing errors made by the English/L2 group concerned morphology, especially regarding the use of past tenses, word choice, word order, and subject omission. A tendency to form adjectives in plural was also observed.

Spanish/L1	Englaterra (Inglaterra); Haga (Hago); Me conocido (Me he conocido); Halla (Haya); No mea cuerdo (No me acuerdo); Inposible (Imposible); Estoi (Estoy); Ha (Hay); Esta a el (al) Mediteraneo (Mediterráneo); Mueseos (Museos); Y hicimos (E hicimos); Emos (Hemos); Los inglese (Los ingleses); Letoninia (Letonia); Sus vida (Su vida); Gra proyecto (Gran proyecto); Nonitos (bonitos); Altos países (Países del Norte)
English/L1	Hoter (Hotter); Ceasta (Siesta); Dont (Don't); Ready (Really); Tyed (Tired); Scarey (Scary); Exceptable (Expectable); Then (Them); Tiering (Tiring); Traveld (Travelled); Countri (country); Itliy (In Italy); Foods (Food); Compair (Compared); Alot (A lot); Confitence (Confidence); Ther (Their); Takeing (Taking); You (your) games; I have met lots of children in (from) different countries; Happy of met they (meeting them); The food id (is)
English/L2	We get up (We got up); I play (I played); We have a draw (We drew); There is sunny (It is sunny); Orrible (Horrible); Only I eat (I only ate); Speak very good (Speak very well); Tunels (Tunnels); It called (It is called); Countryes (Countries); Diferents (Different); Whit (With); Childrens (Children); Others monuments (Other monuments); I went to breakfast (to have breakfast); Chieps (Chips); Cuallet (Quiet); There tipical food (Their typical food); Fotball (Football); Playgraund (Playground); Serius (Serious); In england are eat the breakfast later are go to the room (in England they have breakfast later, they go to their rooms); I don't met (I haven´t met); I don't now (know); We arrive in Bristol (We arrived); Most of the days rain (it rains)

Table 7. Common Writing Errors in the Corpus (Correct Forms Provided in Brackets).

7. Discussion

The aim of the present study was to analyse the relationship between attentional capacity and written production of a group of children, native speakers of English, and native speakers of Spanish learners of English/L2. Regarding their linguistic profiles, while children from the United Kingdom attended mainstream schools, Spanish children attended a bilingual school where the CLIL approach is implemented and 25% of the instruction they receive is in English.

Overall, most correlations obtained between children's attentional capacity and linguistic measures employed in the study were not significant. However, the statistical analysis carried out considering separately L1 and L2 groups revealed some interesting patterns. More precisely, we observed negative correlations, though not significant, between the scores in CARAS-R and the number of errors, and these correlations were higher for the English/L2 group. Although no firm conclusions can be drawn, the findings seem to be congruent with empirical evidence on the cognitive load imposed by written production in L1, but especially in L2. We, therefore, agree with Robinson and Gilabert (2007: 170) that "attention mediates the processes of comprehension, production, and learning of languages", as well as with Kahneman (1973: 9), who emphasised the strong link between effort and attentional capacity: "Different mental activities impose different demands on the limited

capacity. An easy task demands little effort, and a difficult task demands much. When the supply of attention does not meet the demands, performance falters, or fails entirely".

Another finding of the present study refers to the type of writing errors made by the participants. Letter omissions and substitutions constituted the prominent pattern in both L1 and L2 texts. To explain most of these errors, we have to keep in mind that text generation for novice writers, especially for children, is usually limited to the translation of ideas directly from oral discourse by converting the sound pattern to printed word. For example, in English *traveld** and *travelled* are pronounced in the same way, just like in Spanish *halla* (to find) is a homophone of *haya* (to exist), and their exact meaning can only be inferred from contextual clues. Interestingly, in Spanish/L1 most writing errors fell into the category of homophones, while in English/L1 writing errors derived mostly from letter omission or substitution. In most cases, these errors could be considered as attentional-related errors (diversion of attention, distraction, paying attention to other writing features, etc.) since it is difficult to believe that a 10-year-old child is not able to conjugate correctly verbs like *to be* or *estar*. It has been assumed that phonological capacity, phonemic awareness, and working memory capacity are crucial in early stages of writing acquisition (see, for example, Gathercole/Lamont/Alloway 2006). It appears that attentional capacity and visual perception of printed words and letters have also a role to play in children's handwriting skills.

Regarding writing errors in English/L2, they fell into various categories: letter omissions and substitutions, morphological errors, agreement errors, and wrong word choice, among others. Since attentional capacity is limited, high cognitive load imposed by written production can make L2 writers –especially children– to prioritise some aspects of writing (e.g., content generation) at the expenses of others (e.g., accuracy, use of cohesive markers, spelling, etc.). Ideas, and sometimes even isolated words, are transferred from memory to paper; however, lack of basic –vocabulary and grammar– knowledge in L2 may impair

writing quality, as well as the way these ideas are expressed (e.g., less elaborated and coherent ideas).

Instances of L1 to L2 interferences were also observed. Indeed, many L2 spelling errors could be due to the interference of children's L1 (Spanish), as illustrated by the following examples: *diferent* – diferente* (Spanish) – *different* (English); *tipical* – típico* (Spanish) – *typical* (English); later go to school* – después (ellos) van al colegio (in Spanish, subject pronouns can be omitted) – later <u>they</u> go to school (English). Instead of considering these errors as linguistic deficiencies, it is important to acknowledge that these children drew on their L1 linguistic knowledge in order to communicate their ideas, embedding L1 aspects to their L2 writing. This interpretation is consistent with the vast empirical evidence from the field of Second Language Acquisition on the integral role of L1 in L2 written production, especially in multilingual contexts, and the need outlined by many researchers to embrace L1 use in the L2 classroom (Cook 1999; Cumming 2009, 2013; Manchón/Roca de Larios/Murphy 2009; Ortega 2009; Woodall 2002).

Moreover, a negative correlation was revealed between children's attentional capacity, as assessed by CARAS-R, and the number of words they used in their L2 texts (i.e., children with higher attentional capacity tended to write shorter compositions). It is well known that the ability to write longer essays does not necessarily match or co-occur with a high writing quality or a greater degree of linguistic accuracy. A plausible explanation for this finding is that children with higher attentional capacity needed –or even took– more time to process and translate their ideas. This could have resulted in a trade-off effect between linguistic processing and production speed. Nevertheless, the aforementioned trade-off should be regarded as a useful strategy, since paying attention to certain linguistic aspects of written production by slowing down the speed of (hand)writing may help students to achieve a higher degree of linguistic accuracy in their L2 writing. In other words, high attentional capacity L2

learners may use time allotted for the completion of a writing task in a different manner; for example, they may dedicate more time to searching, rehearsing and retrieving linguistic items from long-term memory, which, in turn, may be beneficial for correct spelling and choice of words or verb tenses. In a similar vein, Ahmadian (2012: 173), based on the results of his study, concluded:

> With second or foreign language learners, however, most operations require controlled attention and run serially, which exerts heavy processing loads on the limited capacity of working memory. In other words, as Temple (2000, p. 296) argues, in L2 speech working memory may simply get 'overloaded' by (a) attempts to compensate for 'the reduced knowledge base of lexis, syntax, morphology, and phonology'; (b) 'greater monitoring and repairing'; and (c) allocating resources to inhibit the L1.

Although Ahmadian's study focused on L2 oral performance of adult learners of English, it is worth noting that, under specific task conditions, underlying mechanisms of oral and written production are quite similar. Children who participated in the present study had to write texts in real time. They also had to monitor their production, as well as to inhibit possible interferences from their L1, just the same way as when L2 learners engage in oral tasks.

8. Conclusions

The current study highlights the cognitive load imposed by written production not only in L1 but also in L2, at least in the case of children, as well as the different strategies these young writers employ while struggling with pen(cil) and paper. However, it is also subject to several limitations. First, the sample size was small and only one task was used in order to assess children's attentional capacity. Therefore, increasing the sample size and the number of tasks

measuring cognitive capacities, not just attentional, would increase the generalizability of the present findings. Second, our study did not focus on high-level writing processes such as planning, translating and editing, neither on *how exactly* young writers draw upon their L1 linguistic resources while writing in a L2. Future studies should examine in more depth L1-L2 interactions, the use of L1 as a scaffolding strategy by young writers, and code-switching phenomena, which are of particular interest in multilingual classrooms and CLIL settings. Third, in order to preserve the ecological validity of the study, the time children spent on the writing task was approximately half an hour. Follow-up studies should attempt to control task conditions more closely and, if possible, to include different task conditions by manipulating variables such as time-on-task, planning or writing topic. It would also be interesting to include mainstream (non-CLIL) students in a similar study in order to determine how different learning contexts affect linguistic accuracy.

Another interesting topic related to writing is the use of digital technologies and tools. For children and adolescents, computers and tablets have turned out to be the prevailing mode for writing, as they start using them from an early age, even before they learn to use pen(cil) and paper (Couse/Chen 2010). Recent evidence points to a relationship between cognitive capacities (visual recognition, perception, and orientation, control of attention, memory, etc.), on the one hand, and hand type and/or digital writing, on the other (for reviews, see Heuer 2016, and Mangen and Balsvik 2016).

Moreover, various authors stress the importance of providing young students with clear writing instructions and meaningful opportunities to engage in writing practices (Graham/Perin 2007; Graham/Santangelo 2014). Thus, future research should try to scrutinise the relationship between cognitive abilities and digital writing, controlling for individual differences in the amount and time spent on writing practices or the contexts in which literacy skills were initially acquired.

To conclude, our ultimate aim is to acknowledge the importance of writing –with its inherent cognitive load in both L1 and L2– for any kind of learning since writing activates thinking (Elser 2008; Quitadamo/Kurtz 2007; Schmidt 1999. Writing and thinking are "compatible, synergistic processes" (Schmidt 1999: 31); they are "practically twins" and being a "substantive thinker" results –among other factors– from the acquisition of a good command of the written language (Kellogg 2008: 2).

Acknowledgments

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