

Syntactic Complexity in Narratives Written by Spanish Heritage Speakers

Verónica Sánchez Abchi
Université de Fribourg, Switzerland
veronica.sanchez@unifr.ch

Vanesa De Mier
CIIPME, CONICET
Buenos Aires, Argentina
vanesademier@conicet.gov.ar

Abstract

The present study focuses on the analysis of syntactic complexity (SC) in written narratives produced by Spanish heritage language speakers, growing up in a multilingual context. In order to describe the level of syntactic complexity of a text, we considered traditional measures of SC (T-Units, mean length of T-Unit, syntactic complexity index, and percentage of error free clauses). Also, we assessed the type and frequency of subordinate clauses used in the children's written productions. Besides, we explored possible associations between syntactic complexity and different variables (such as age, Spanish input at home and time attending Spanish courses). Finally, we compared the SC performance of the heritage speakers (HS) with that of full Spanish speakers. Results showed that the groups do not differ greatly in the SC of their text productions. Findings are discussed considering the exposure to Spanish and the cognitive demands of writing.

Keywords: Syntactic complexity, Heritage Speakers, Narratives, Written production, Subordinate Clauses

Resumen

Este estudio se centra en el análisis de la complejidad sintáctica (CS) en narrativas escritas por niños que hablan español como lengua de herencia (LH). Para el análisis, se consideraron medidas tradicionales de CS: unidad terminal, extensión de la unidad terminal, índice de complejidad sintáctica y porcentaje de cláusulas libres de error. Asimismo, se evaluó el tipo y la frecuencia de subordinadas utilizadas en las

producciones. Se exploraron también las posibles correlaciones de la CS con otras variables, tales como edad, input en español y tiempo de asistencia a cursos de español. Finalmente, se comparó el nivel de CS de los textos de hablantes de herencia con el de niños que crecen en un contexto hispanohablante. Los resultados no mostraron diferencias relevantes en la complejidad sintáctica de las producciones de ambos grupos. Los resultados se discuten teniendo en cuenta la incidencia del contacto con el español y las demandas cognitivas de la escritura.

Palabras clave: Complejidad sintáctica, Hablantes de lengua de herencia, Narraciones, Producciones escritas, Oraciones subordinadas

1. Introduction

An important dimension to the study of textual competence is the syntactic level. Indeed, syntactic complexity –also known as syntactic maturity– is a relevant factor to describe the characteristics of text production, as it refers to the nature of syntactic constructions used in oral or written discourse.

In this vein, the complexity of a text is associated with the ability to combine sentence components, mostly subordinated clauses. This becomes more proficient with age and is understood as a sign of maturity in a language. In this regard, the use of complex sentences can be an indicator of a high level of syntactic development, while a high amount of clause coordination could be interpreted as an evidence of syntactic immaturity (Bartolomé Rodríguez, 2009; Véliz, 1999). Although this might appear simplistic (given that other factors such as textual genre or production modality could also be involved in the development of syntactic complexity), the syntactic level is still strongly correlated with age. Moreover, in the case of children, limited use of syntactic complexity in their narratives was also found to be related to text formulation problems and even linked to school performance (Gutierrez-Clellen, 1998; Restrepo et al., 2010). In line with previous findings, we understand syntactic maturity as a reliable factor to describe certain levels of text complexity.

Studies on L2 writing have also considered syntactic complexity as a construct to describe and explain complexity and proficiency (see review in Ortega, 2003). However, there is a lack of research addressing syntactic complexity in writing within child heritage speakers (HS).

The present article intends to address this gap by studying syntactic maturity in written narratives produced by children who speak Spanish as a heritage language, but have grown up in a multilingual context, with French or German as a majority language.

2. Syntactic Complexity and Text Production

In order to describe the level of syntactic complexity of a text, Hunt (1965, 1970) defined the Terminable Syntactic Unit (T-Unit), or idea unit, as the main clause and any subordinate clauses attached to it. From this perspective, coordinated clauses are counted as separate T-Units. On the basis of this unit, Hunt proposed three different measures: a) the Media Length of T-Unit, b) the clause length and c) the syntactic complexity index (SCI), which shows the number of subordinate sentences for every T-Unit. These measures have been largely used, and adapted to assess the syntactic characteristics of oral and written text productions in both L1 and L2. Other measures – concerning coordination and phrasal complexity – have also been explored in different studies (see review in Neary-Sundquist, 2016). Furthermore, some of these seem to be complementary measures which allow us to understand complexity as a multidimensional construct (Yang, Lu and Weigle, 2015).

Moreover, it has been observed that syntactic complexity increases with age, even when the syntactic features of a text seem to depend on different factors, such as textual genre, production modality and type of task. It is noteworthy that the correlation between age and syntactic complexity becomes evident in the general linguistic development. For instance, Feilke (1996) observed that young children – 9 to 10 years old – mostly use coordinated sentences in written productions, but tend to integrate more information in subordinate clauses by the age of 14. Finally, teenagers and adults progressively use more nominalizations, which is considered as a higher level of syntactic development. Taking into account specific measures to assess syntactic complexity (based on Hunt's works), previous studies of Spanish written productions have shown an increase in syntactic complexity associated with age and school level (Gutiérrez-Clellen and Hofstetter, 1994; Herrera Lima, 1991; Olloqui de Montenegro, 1991; Rodríguez Fonseca, 1991; Torres González, 1996; Vázquez, 1991; Véliz, 1988).

Furthermore, syntactic complexity is considered to be a predictor of writing quality, because some measures of accuracy have been found to correlate with holistic writing measures (Wolfe-Quintero, Inagaki and Kim, 1998). However, the relationship between complexity and quality could strongly depend or vary according to the textual genre (Beers and Nagy, 2009). For example, Dubuisson, Emirkanian and Sankoff (1989) compared different types of text and observed that even when syntactic complexity increases with age, narratives are less complex than explanations. For their part, Beers and Nagy (2009) examined the relationship among different measures of syntactic complexity with rated quality for different genres. They found that the index “clauses per T-Units” was positively correlated with quality in the case of narratives, but negatively in the case of essays. Thus, different types of discourse could imply different levels of syntactic complexity, under the assumption that the textual genre also affects

the syntactic features of the texts (Crowhurst, 1980; Klecan-Aker and Hedrick, 1985; Schick, 1997; Silva, 2008; Véliz, 1999; Verhoeven et al., 2002).

Importantly, syntactic complexity can vary depending on the production modality –written or oral production (Calude, 2005; Silva, Sánchez Abchi and Borzone, 2010). In this respect, some authors agree that written language production may be more complex (Horn, 1926, cited in Hudson-Ettle, 1998; Harrel, 1957; Drieman, 1962; Blankenship, 1962; O'Donnell, 1974; Kroll, 1977; Chafe and Tannen, 1987; Ochs, 1979; for a review, see Calude, 2005). Others observe more frequent subordination in oral production (Biber, 1988; De Vito, 1965; Horowitz and Newman, 1964) and yet others estimate that syntactic mechanisms are similar in both modalities (Cleland and Pickering, 2006). In line with the latter view, some authors have found that even when oral and written production have a similar level of complexity, some differences can be associated to the level of formality, the characteristics of planning, the writing style, and the level of education of the subjects who participate in the studies (Beaman, 1984; Biber, 1988; Miller, 1994; Thompson, 1984).

In a recent longitudinal study, Silva et al. (2010) examined the differences between modalities in 1st and 2nd grade Spanish-speaking children. The aim was to assess whether complexity differences between oral and written productions could be explained by constraints of transcription skills in writing. Children's writing abilities were evaluated with an oral/written retelling task. The authors considered: length, T-Units, and SCI for the analysis, and a word spelling task to assess basic skills. The results showed differences between modalities in Text Length and T-unit, but not in SCI. This suggests that the transcription processes did not affect the syntactic complexity of written texts, even when these were shorter. Furthermore, the differences between modalities were less important in the 2nd grade. Also, the patterns of correlation of length and SCI with other tasks that evaluated transcription skills changed when the children got older. The authors assumed that there might be a relationship between modality and syntactic complexity, but this weakens progressively as children automatize the low level skills implied in the writing processes – that is to say, transcription and phonological codification.

Syntactic skills of children growing up in multilingual contexts have been less studied comparatively. Gutiérrez-Clellen and Hofstetter (1994), who analyzed oral narrative productions of Mexican American and Puerto Rican children at the beginning of school (1st and 3rd grade), observed that length of T-Units, index of subordination and frequency of relative clauses seem to increase with age. Later, Gutiérrez-Clellen (1998) compared the syntactic skills of Spanish-speaking children with low and average literacy achievement in two different oral narrative tasks: story book retelling and film retelling. Although the author did not find a task effect, she did observe an association

between syntactic performance and school achievement. Remarkably, children with difficulties in school produced significantly less complex texts, in view of median length of T-Unit and index of subordination. It is worth noting that these studies focused on oral narrative productions in Spanish. Written production, however, could reveal specific results related to syntactic complexity, due to the characteristics of the written system and the cognitive demands in writing (Francis, Domo and Gelman, 2002).

3. Written production: Syntactic complexity in L2 and in Heritage Language

Syntactic complexity is a useful measure to assess performance in L2 (see review in Ortega, 2003); but the research designs and the instruments used should be carefully examined, as they may lead to inconclusive results. Indeed, the relation between L2 proficiency and writing syntactic complexity (SC) in the target language seems to vary depending on two main aspects: a) the definition of proficiency, and b) the contexts of learning. To this end, Ortega (2003) reviewed a total of twenty-five studies concerning syntactic complexity in L2. The author concluded that proficiency is associated with increases in SC only when it is defined by program level – that is to say, proficiency corresponds to a certain level in a language curriculum. However, when proficiency was defined on the basis of holistic ratings (i.e. global assessment of quality), independently of a program level, SC increase was not related to higher language proficiency. Ortega also observed that the increase in SC could be the consequence of instruction settings, because the results were different for L2 or foreign language.

Regarding the definition of SC and the measures used to assess it in L2, the T-Unit has proved to be a satisfactory unit -even for Chinese, in which the definition of T-Units was slightly modified in order to correspond to the language characteristics (Jiang, 2012). Given that errors could be very frequent in an L2, another measure – the error free T-Unit – was considered to be more precise to assess the syntactic complexity in L2 writing (Scott and Tucker, 1974). The concept of error could be built up on different criteria: it could be a deviation of prescriptive standard norms or it could be based on a larger perspective, considering also non-standard usages (Housen and Kuiken, 2009). An error free T-Unit is not only judged on syntactic structure, but also on its meaning in contexts. Other authors used a morpho-syntactic criterion, in order to define the analysis more precisely (see review in Camus and Andrada-Rafael, 2015). The error-free T-unit was found to be an accurate way to assess L2 writing development in college and university students. However, evaluating young children's written productions can be very complex, as their literacy system itself is in the process of acquisition.

Although research concerning written production in L2 could be helpful in our understanding of syntactic complexity in a language that is not the majority one, there are some particularities that should be taken into account when we study HS. It is worth mentioning that a heritage speaker is not an L2 speaker. As said before, HS grow up with a home language other than the majority language, but they tend to be dominant in the majority one, since they learn it very early and it is their school language (Polinsky, 2011). Conversely, their level of proficiency in the family language could be very different depending on diverse factors, such as linguistic input, socioeconomic status and education (Valdés, 2005). HS usually have higher oral than written competence (Schwartz, 2005; Valdés, 1995), because they learn to read and write in the majority language. This view is further supported by evidence indicating that SC could substantially vary when writing in L2 or in a heritage language (Montrul, 2010; 2011).

Other researchers have found no differences related to proficiency in the speaker's family language. For example, Schwartz (2005) analyzed writing performances and strategies of adult Spanish HS with different levels of command in Spanish. Despite her focus on writing strategies, the author also assessed complexity and accuracy of written texts. She considered number of words, number of T-Units, the syntactic complexity index, number of errors divided by the number of T-Units and number of error-free T-Units. The author did not observe distinctive differences at any linguistic measure among the participants. However, it is worth noting that the sample was very small, as there were only 5 participants in the study.

Contrasting results have also been reported in an effort to find out whether some differences could be identified in writing competence. Camus and Andrada-Rafael (2015) explored writing frequency, complexity, and accuracy in texts produced by both Spanish L2 learners and Spanish HS. They assessed complexity on the basis of three measures (mean length of T-unit; mean number of clauses per T-unit, and mean length of clause), accuracy (percentage of clauses with no morpho-syntactic errors) and fluency (words produced in a period of time). Contrary to previous studies, the results showed that HS outperformed L2 learners in accuracy and fluency, as well as in some of the complexity measures.

Moreover, other studies have analyzed HS of other languages (e.g., Polinsky 2006, 2008). Polinsky (2008) described differences in oral narratives between Russian HS and full speakers of the same language. The narratives were analyzed considering different measures, such as length of narratives, mean length of utterance and number of embedded clauses. Even though there were no differences in length, HS used shorter utterances and less embedded clauses than full speakers. Thus, it could be possible to infer that SC in HS is lower than in full speakers. However, the size of

the sample was quite small (two Russian HS, and two Russian native/full speakers as a control group, one adult and one child in each group), so these results should be interpreted with caution. More recently, Polinsky (2011) also compared HS and full speakers (both children and adults), but with a larger sample. Here, the author tested the comprehension of relative clauses. Similar to the study concerning text production, a full mastery of relative clauses was observed in bilingual and monolingual children, but heritage adults were outperformed by the other groups. This phenomenon suggests attrition of the heritage language in this particular syntactic domain.

In sum, the results of the studies concerning mostly adult HS are not conclusive, but suggest that several differences could be found between adults and children. Indeed, although there are an increasing number of studies investigating syntactic complexity, this variable has been barely studied within the written productions of HS. To our knowledge, no research has addressed syntactic complexity in written narratives produced by child HS.

4. The present study

The purpose of the present study was to assess the syntactic complexity in written narratives produced by children who speak Spanish as a heritage language. We looked for children attending language and culture of origin courses in Switzerland. In these courses, not only oral communication, but also literacy skills in Spanish are promoted. In order to find out whether some differences would show with full speakers, we also compared the SC of texts produced by Spanish speaking children growing up in a mostly monolingual context, in Córdoba, Argentina. Conceivably, the latter group could outperform Spanish HS, because of their linguistic context and the time of instruction in that language. In addition to traditional measures of SC, we also analyzed the type of subordinate clauses used within each group, so as to better understand the syntactic characteristics of HS. Relative, nominal and adverbial clauses were identified, following a traditional grammatical criterion that assimilates the clauses to syntagmatic categories (see review in Di Tullio, 2005). We only considered subordinated clauses with a conjugated verb and a subordinator, in order to avoid possible misinterpretations and to better compare our results with previous works in other languages.

In a second part of our study, we explored possible associations between syntactic complexity and children's age. Besides, we considered the relationship with other factors that can also have a decisive influence in children's literacy and an impact on the syntactic complexity of HS: school level, the input of Spanish (home-school in Spanish) or the time they have been attending Spanish courses (Schwartz, 2005). In this regard, the following research questions were formulated:

- a) Do Spanish HS and Spanish speakers growing up in a mostly monolingual context differ in the level of syntactic complexity used in their written narrative productions?
- b) Do Spanish HS and Spanish speakers growing up in a mostly monolingual context differ in the type and the frequency of subordinate clauses they use in their narratives? If so, what kind of differences can be identified?
- c) Do Spanish HS from different regions of Switzerland (French speaking and German-speaking part) differ in the syntactic complexity of their written narrative productions?
- d) What factors could potentially be linked to the syntactic maturity development in HS children?

5. Method

5.1. Participants

164 children participated in this study. They were distributed in two groups: a) a group of 118 children with Spanish as a Heritage Language who have grown up in a multilingual context (henceforth SHLG) and b) a group of comparison (CG), made up of 46 children growing up in a Spanish-speaking context.

SHLG: There were 118 participants ranging in age from 8.6 to 13.7 years, with a mean age of 11.1 at the moment of the study. All children attended non-compulsory courses of Spanish as a heritage language, in nine different institutions. The group consisted of 34 children living in the French Speaking part of Switzerland and 83 from the German-speaking part of the country. Note that in the German-speaking part of Switzerland, standard German is taught at school, but children speak Swiss-German dialect among them, due to the diglossia in this region.

All participants were HS of Spanish. However, the group was not homogenous: 65,25% came from mixed families (one Swiss parent and one parent with migrant origin), while 34,75% were first generation migrants, born in Switzerland or arrived in Switzerland at an early age. As regards the place of birth, 88,13% were born in Switzerland and the rest arrived when they were young; the average age at immigration was 5.3 (four children were born in Spain, two in Mexico, two in El Salvador, one in Colombia, one in Peru, two in Argentina and one in Paraguay). All children

participated with parental consent. According to the teachers' reports, they had no known physical, linguistic or psychological impairments.

Language and Culture of Origen Courses (LCO)

As mentioned earlier, SHLG children attended LCO courses. The Language and Culture of Origen Courses (LCO) exist in Switzerland for different languages, and they are recommended – and at certain point supported- by education policies in the country. The LCO courses of Spanish as a heritage language in Switzerland are organized by the Spanish embassy and/or by non-governmental organizations – frequently parent associations (Calderón, Fibbi and Truong, 2013). The courses normally last between 1.5 to 2 hours a week, and take place at a time when the children do not have to attend official school.

Parent Questionnaire

The Children's family completed a questionnaire which gave us better knowledge of each child's linguistic background in the SHLG. Parents were asked to provide information about the early family literacy practices, the percentage of Spanish input at home and the time children have attended the LCO courses. The first variable – literacy practices – was operationalized with two questions: frequency of storytelling before the school beginning in Spanish and in the school-language. Concerning early literacy practices, the frequency of storytelling in school language and in HL was comparable: 44, 3% of families claimed telling stories in French or German every day, while 42, 4% of the families did the same in Spanish.

The period of attendance to the Spanish Heritage Language Course was also considered, since syntactic complexity is linked to the literacy experience in a language. In this regard, the groups were very heterogeneous: The mean of attendance was 3.4 years, but the SD was high: 1.8 years (ranging from 9 months to 6 years). Likewise, parents were required to estimate the percentage of presence of the different languages at home. According to the answers, the mean presence of Spanish at home was estimated to be 42,10% (S.D. 27,6%).

The questionnaires allowed us to determine the level of education and the parent's knowledge of language. Slightly more than half of the mothers (50,4%) and fathers (53,15%) of the SHLG children had a university education level and about one third (34,4%, resp. 36,00%) followed a vocational education. The rest stopped education after primary or secondary school.

CG: 46 children, around 9.3 and 12.1 years old (mean age 10, 4; S.D. 0,9), from the province of Córdoba, Argentina participated in the study. They have grown up in a monolingual context and all of them speak Spanish at home. They attend a school where most of the courses are in Spanish, but they attend 6 hours of Italian and 2 hours of English a week. The family level of education was also controlled. Similar to the SHSG, a 54,5% of mothers and 61,4% of fathers have finished the university, while a 13,6% of mothers and 2,3% of fathers have reached a tertiary level education. The rest of the parents have stopped their studies after finishing secondary school.

5.2. Materials and Procedure

The stimuli consisted of a three minutes silent animated short film, *Something fishy* (Konyha, 2002). The story has two episodes and a coda as final stage, in which the characters expressing attitudes and feelings toward the story. After watching *Something fishy*, all participants were asked to write this story in Spanish (For a detailed description of the structure of these videos, see appendix 1).

The story was selected as experimental material mainly for two reasons. Firstly, the film does not provide linguistic input, so that the text effect in the retelling task could be eliminated; and secondly, the events seem familiar and attractive to children.

The study took place in a classroom environment. Children of the same class were tested simultaneously. All participants were tested by the end of the second semester (May-June, 2015). The total duration of the experiment was about 45 minutes.

5.3. Measures

The texts were analyzed considering the following measures: (a) Length of texts (quantity of words); (b) Presence of T-Units (main clause and all its subordinate clauses); (c) Mean length of T-Units in words (MLTU); (d) Syntactic complexity index (SCI); (e) Percentage of error-free clauses (EFC) and (f) Subordinate clauses (SC). Note that SCI was calculated according to Hunt (1970) and it was obtained by dividing the total number of subordinate clauses by the total number of T-Units. Concerning EFC, we calculated the percentage of clauses with no morpho-syntactic errors. We took into account morphological errors in verbs and nouns, preposition mistakes, inadequate syntactic order, verbal agreement problems and selection of verbal mode (particularly important for subordinate clauses). Orthographic and spelling errors were not considered. Also, we contemplated the total number of SC and they were classified depending on their functions (Di Tullio, 2005). Following Gutiérrez-Clellen (1998): a) Relative clauses: embedded clauses that modifies a noun phrase (e.g., *El pez*

rosa que estaba esperándolo se asustó, [The pink fish that was waiting for him got scared]. b) Nominal clauses: Embedded clauses with the function of a noun phrase in the main clause (e.g., *él ve que las pirañas están llenas, [He saw that the piranhas had eaten enough].* c) Adverbial clauses: Embedded clause that convey information about location, time, manner, cause, purpose, comparison and condition. (e.g., *cuando el cangrejo paró, miró dónde estaba, [When the crab stopped, he saw where he was].* As explained before, we only took into account subordinate clauses with a conjugated verb and a subordinator.

In order to increase reliability, both authors independently analyzed the productions and identified T-Units and subordinate clauses. In cases of disagreement, the differences in coding were discussed and resolved, so that a 100 % agreement was reached.

6. Results

6.1. HS and monolingual speakers

Considering our first research question, the analysis of children’s productions showed very few differences in the performance of the SHLG and the CG. Performance of the groups is reported in Table 1, which presents descriptive statistics (means and standard deviations) for all variables and both groups (Spanish heritage speakers and Spanish monolinguals).

Table 1. Means and Standard Deviation for SHLG and CG.

	CG		SHLG		<i>t</i>	<i>P</i>	Cohen's <i>d</i>
	M	SD	M	SD			
Length	83	20,12	87,3	37,44	.737	.346	.003
T-Units	12,58	8,87	13,96	12,3	.692	.490	.003
MLTU	7,38	1,81	6,93	1,73	-1.447	.150	.013
SCI	0,3	0,21	0,2	0,19	-2,589	.011	.040
Percentage EFC	99,61	1,47	22,23	18,5	-28.331	.000	.833

The children's performance in each variable and language was in average range compared to other studies (see revision in Silva et al., 2010). The data also indicated group-internal variability for several variables. We expected texts in the comparison group to be comparatively longer, as those children are used to writing in Spanish. Nevertheless, the HSLG productions were even longer than monolinguals' productions.

Previous studies focusing on oral texts did not even find differences (Polinsky, 2008). In the present study: however, the focus was on written production, which is usually the less developed competence in HS. Moreover, the mean of T-Units was higher in the SHLG than in the monolingual group. We carried out a t-student test, in order to analyze the differences between groups. Results showed non-significant differences in the case of Length ($t(162) .737, p = .346$) and T-Units ($t(161) .692, p = .49$). This lack of differences in length between groups may be because both groups followed the same story plot, which has also been reported in previous studies (Polinsky, 2008),

In contrast, the MLTU and SCI values were slightly higher in the CG. Nevertheless, the t-student test showed that the differences were not significant ($t(162) -1,447, p = .450$, and $t(159) -2,589, p = .011$, respectively). It is worth noting that the SD was also higher in the HSLG, suggesting an important degree of heterogeneity among these children.

On the other hand, the main difference lies in the percentage of EFC: The comparison group performed remarkably better than the HS ($t(162) -28.331, p = <.005$). Contrary to our expectations, preposition and verbal mode errors were highly frequent, while syntactic order problems were almost absent among the bilingual children. It should also be noted that Cohen's *d* values in table 1 show a large effect size for the significant difference found in the EFC variable, demonstrating the relevance of such difference.

6.2. Use of subordinate clauses

Our second question examined the use of subordination strategies within the groups. We analyzed differences concerning the use of subordinate clauses and thus considered the quantity and type of clauses used in children's narrative texts. Table 2 shows means and SD for both groups, SHLG and CG.

Table 2. Subordinate clauses within SHS and Monolingual group.

	SHLG		CG		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	M	SD	M	SD			
Subordinate clauses (SC)	2,53	2,44	3,22	2,11	-.663	.098	.017
Nominal clauses	0,26	0,53	1,5	1,47	-7.865	.000	.280
Relative clauses	1,12	1,22	0,2	0,4	5.024	.000	.137
Adverbial clauses	1,17	1,74	1,52	1,43	-1,204	.230	.009

The comparison of the two means showed no significant achievement difference between the groups for the total amount of subordinate clauses, even when the comparison group slightly outperformed the HS ($t(160) -1.663$, $p=.098$). However, the results revealed that the SHLG produced more relative clauses in their narratives than the CG, and this difference was significant ($t(159) 5.024$, $p < .005$). In contrast, the CG used more nominal and adverbial clauses in their texts. The comparison of means indicated that the differences between the groups were significant for nominal clauses ($t(159) -7.865$, $p < .005$). In the case of adverbial clauses, although no significant difference was found between the groups ($t(159) -1.204$, $p=.230$), it seems that fewer children in the SHLG use adverbial clauses in their narratives. Indeed, approximately half of the SHLG children used adverbial clauses at least once, as compared to 68% of the children in the CG.

It should also be noted that the effect sizes for the significant differences in the use of nominal and relative clauses are moderate to large, which emphasizes the writing performance of the CG.

6.3. Spanish HS in different linguistic contexts

As regards our third research question, we also explored the differences between the geographical regions in Switzerland, assuming that probably the majority language spoken in the context could also have an influence on the performance in Spanish. In fact, as French and Spanish are typologically closer, it could be expected that children from the French-speaking part of Switzerland would outperform children from the German-Speaking region in the country. Besides, since subordinate clauses in German present a different word order than in Spanish or French, it was also expected to find more errors of this type among the German speakers. Table 3 presents the media and SD for every linguistic region.

Table 3. Means and SD for HS from different linguistic regions.

	Swiss German – SHL		French Swiss - HL		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	M	SD	M	SD			
Length	85,04	37,46	92,66	37,37	-1.010	.315	.009
T-unit	13,79	10,75	14,37	15,5	-.232	.817	.002
MLTU	6,57	1,42	7,8	2,1	-3.686	.000	.105
SCI	0,17	0,16	0,28	0,23	-2.942	.004	.071
Percentage EFC	18,08	15,14	31,93	21,89	-3.938	.001	.119

In sum, the longest texts are those produced by the French-speaking children (even longer than those of the comparison group, see Table 1). The French-speakers produced not only the texts with more T-Units, but also the most syntactically complex texts – as shown by the SCI mean and the MLTU. There were significant differences in SCI ($t(113) -2.942$, $p < .005$) and MLTU ($t(116) -3.686$, $p < .001$). Nevertheless, the *t*-student test showed no significant differences between French and German speakers neither in text length ($t(116) -1.010$, $p = .315$) nor in the number of T-Units ($t(115) -.232$, $p = .817$). The percentage of EFC was also higher in the French speaking group and, in this case, statistically significant differences were observed between groups ($t(115) -3.938$, $p < .001$).

Taken together, these results show a general advantage for children speaking French. This suggests that children had fewer difficulties at writing syntactically complex structures, because French and Spanish are typologically closer. However, it is worth noting that EFC is mostly an accuracy measure, linked to a morpho-syntactic level and not to syntactic maturity itself. Moreover, Cohen's *d* values in table 3 also show that, although there are significant differences in some of the syntactic complexity measures, the effect sizes are rather small (Cohen's *d* ranging from .07 to .12)

Regarded like this, the results do not allow us to bear out advantages in the syntactic level, solely for children speaking two typologically close languages. So, such difference should be interpreted as a tendency.

6.4. Syntactic Maturity and individual differences

With the aim of examining the associations between the variables under consideration and the linguistic background of children, we calculated correlation coefficients between the syntactic measures for HSG and some background variables: age, frequency of storytelling, percentage of input of Spanish at home, and time of attending Spanish Heritage language courses. Table 4 summarizes the correlations between each of these variables.

Table 4. Pearson correlations between syntactic complexity measures and context variables for the HSG.

	Correlations					
	Syntactic Complexity Variables					
	1. Length	2. UT	3. MLTU	4. SCI	5. EFC	6. SC
<i>Context Variables</i>						
1. Age	,417**	-0,01	,449**	,266**	0,047	,316**
2. LCO Courses attendance	,384**	0,038	,259**	0,165	-0,047	,301**
3. Percentage of Input in Spanish	0,082	-0,156	0,095	0,048	-0,175	0,053
4. Frequency of Story Telling	0,105	0,031	0,032	0,033	-0,098	0,030

Note: **p = <.001 TU: terminal unit; MLTU: media length T-Unit; SCI: syntactic complexity Index; EFC: Error free clauses percentage; SC: Subordinate clauses.

Results did not show an association neither between frequency of storytelling in Spanish and syntactic measures, nor between the percentage of input in Spanish and the syntactic measures. The storytelling frequency considered children literacy experience before the beginning of their schooling. At the moment of the study, this variable could possibly be less important because they had already had access to a diversity of literacy experience in school. The input of Spanish at home could probably affect other aspects of linguistic performance, but it does not seem to influence syntactic maturity.

On the other hand, age is significantly positively correlated with length ($r=.417$, $p<.001$), MLTU ($r=.449$, $p<.001$), SCI ($r=.266$, $p=.004$) and SC ($r=.316$, $p=.001$), confirming the results of previous studies which also found such correlations between syntactic complexity measures and age. Time of attendance to LCO course was also expected to be associated with syntactic maturity, since it may be a factor that accounts for writing practices in the heritage language. In this regard, significantly positively correlations with three syntactic complexity measures were found: length of texts ($r=.384$, $p<.001$), MLTU ($r=.259$, $p=.006$), and SC ($r=.301$, $p=.001$). It should also be noted that strength of the relationship for all significant findings is overall moderate, ranging from .26 to .45.

Interestingly, the EFC measure, which appears as an important variable to elicit differences between heritage and comparison groups, did not show associations with contextual variables. This suggests that, regardless the age or the time of attendance to LCO courses, the morpho-syntactic accuracy measures allow to better describe the characteristics of text production in HS.

7. Discussion

The main goal of this study was to analyze syntactic complexity of narrative texts produced by HS, and to compare them with those produced by “full-speakers”, growing up in a monolingual context. Thus, we addressed three research questions, which guided our analysis.

Our first question concerned the Spanish writing skills. In this regard, the results showed a few differences between the comparison group and the HS in their written performance. HS did not differ from full speakers in the level of the syntactic complexity used in their productions. Similarly, we did not find differences between groups concerning the frequency of subordinate clauses used in the narratives, despite the comparison group slightly outperforming the SHLG. Regarding the distribution of the different types of subordinate clauses, we found mixed results. The CG used more frequently nominal and adverbial clauses. Conversely, the HS used more relative clauses than the CG. These results showing a lack of difference between groups seem to agree with previous research (Polinsky, 2011, 2008).

The few discrepancies we found in the use of subordinate clauses between groups are consistent with Polinsky’s (2011) previous studies about comprehension of relative clauses in HS, who did not find differences in the syntactic level among child HS, but did so in adults. The author explained these results, under the assumption that syntactic level in HS seems to be affected by attrition in adulthood. If an attrition

phenomenon is to be observed at the syntactic level, the latter will appear later in language development. However, we did not find evidence of this tendency, as we found an association between age and increase of syntactic level in the texts. Nevertheless, it is relevant to point out that we did not consider groups of adult speakers in our study, and the comparison was carried out between groups of children at one specific point in time, from a cross-sectional perspective. Additionally, it may be worth considering that the education background of participants in Polinsky's studies and in our research is not exactly the same, and this can have an effect on the results (Schwartz, 2005). Whereas in Polinsky's research participants were children and adults who had not received formal instruction in Spanish, in our study children were attending Spanish LCO courses. Even when there was a big variety in this point; all the participants were exposed, to some extent, to literacy practices in Spanish, in the frame of LCO courses. Moreover, according to the questionnaires, 42% of parents claimed to have read stories in Spanish daily at home. For this reason, children were not completely unfamiliar with a discourse linked to writing style in Spanish (Chafe, 1985), fostered by school teaching in LCO and storytelling at home. According to these considerations, literacy practices could have had an impact on children's performance. Indeed, even if no associations were found between syntactic performance and storytelling practices, positive correlations with time of attendance at LCO were found for a syntactic measure that has shown to be correlated with narrative performance: MLTU, suggesting the impact of Spanish instruction on syntactic maturity.

On the other hand, taking into account the writing cognitive demands, we expected an advantage from the CG in the performance, since these children are used to writing in Spanish at school on a daily basis. However, SHL participants in our research seem to have incorporated basic writing processes, either in their school language, or in Spanish. In this regard, writing cognitive constraints seem to have no incidence on the syntactic level, as proposed in some writing models (see review in Francis, Domo and Gelman, 2002).

The main difference between the groups lies on the measure of EFC: the CG overwhelmingly outperforms the HS. According to these results, the morpho-syntactic level lets us describe the characteristics of HS productions in a more precise way. In this sense, and in accordance to previous research, the main difference does not lie in syntactic complexity but in a measure linked to accuracy (Camus and Andrada-Rafael, 2015). Thus, future studies should explore this dimension of texts in detail, in the light of previous results (Montrul, 2011).

Regarding our third research question, which focused on the possible differences in texts according to different linguistic regions, the results show a tendency, but they are far from conclusive. Given that French and Spanish are two languages which are

typologically close; HS from the French-speaking part of Switzerland were expected to outperform their peers growing up in the German-speaking region. This was the case. Nevertheless, the differences between regions were not always important and the standard deviation was frequently higher in the French speaking children group, suggesting a remarkable diversity. In this sense, it is possible to conclude that typological proximity may not necessarily be a facilitator factor to develop – or maintain– a syntactic maturity in the heritage language.

Finally, the positive correlations we found between syntactic measures and children's background variables support the interpretation of our findings, as has been discussed in previous paragraphs. What seems even more interesting are those correlations that were not confirmed: no association was observed neither between SC and percentage of input of Spanish at home, nor between SC and storytelling frequency. The latter absence of correlation could be explained by the age of participants. In fact, the questionnaire asked for storytelling practices at pre-school level but, at the moment of the study, participants were already literate. In the meanwhile, many other factors – like school attendance in the majority language– could have a more decisive role that masks incidence of storytelling in early childhood.

On the contrary, the absence of correlation between heritage language input and syntactic complexity in narrative discourse could be more complex to understand. It could have been expected that children with prolonged exposure to the heritage language would produce a more complex syntactic discourse. However, the fact that they speak at home frequently does not mean that they were exposed to elaborated or academic discursive models. Indeed, discourse at home is usually associated with informal communication.

In addition to that, the level of education of parents should be taken into account. Indeed, the presence of more diverse and literary texts in Spanish at home is related to the educational level of parents. Thus, it might not be enough that both parents speak Spanish at home: also the type of discourse that is present in the interactions should be identified. Likewise, it is important to analyze whether literature in Spanish is present at home or not, whether children address their parents in Spanish or in the majority language, etc. In future studies, a more precise analysis of linguistic practices at home and individual differences should be further considered.

8. Conclusion

The results of this study highlight the multifaceted development of syntactic level in HS. It shows that the syntactic development in the production of narrative

discourse of both groups do not differ greatly, as long as they have some exposure to the minority language. It also confirms results observed for comprehension in child HS of languages other than Spanish (Polinsky, 2008; 2006), and some tendencies that emerge from similar studies concerning oral productions.

We did not assess the transcription skills and, therefore, the design of this study does not allow us to bear out conclusions about the relationship between writing cognitive demands and syntactic maturity. It could be assumed that practice in basic writing skills is comparable in children of both groups (regardless of their school language), as we did not find differences between the writing performance of children who write in Spanish on a daily basis and the HS. In order to find out whether the low-level writing process have an influence on the syntactic maturity, studies with younger children, at the beginning of literacy instruction, should be conducted.

To conclude, our results do not show differences in the syntactic level between the HS and the comparison group. However, it is important to mention that, due to individual differences among the HS, it is not possible to explain these results in a simple way: they could have been attributed to the attendance of LCO courses or to larger literacy practices. In an attempt to isolate this variable, further research should also integrate productions of HS who do not attend these courses.

9. References

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Appendix 1: Plot of "Something fishy".

On the seabed, there was a lobster/ a shrimp. The lobster is looking for food (seaweeds and sea grass) but without success. Suddenly, a pink fish - a piranha- appears, with the intention to eat the lobster. The lobster sees the piranha and becomes frightened. The lobster runs away, followed by the piranha, and seeks refuge in an empty bottle. As the piranha cannot catch the lobster, the latter is safe. The piranha is still trying to catch the lobster. Suddenly, a big fish -a shark- appears. He wants to eat the piranha. The piranha becomes frightened and smiles a little nervously. The piranha runs away, followed by the shark, and tries to meet its family / a shoal of piranhas. The shark meets the shoal of piranhas and it is eaten by them. The piranhas

have eaten enough and they are satisfied. The lobster appears to provoke them. But the piranhas scare it and the lobster flees.