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Exploring multilingual writers in secondary education: insights from a trilingual corpus

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Abstract: This study aims at contributing to the field of multilingual writing and providing evidence for Cummins' Common Underlying Proficiency Hypothesis (CUP) through analysing trilingual writing among secondary education students enrolled in a Basque immersion program. The main objective of the present study is to explore the relationships between participants' compositions in their three languages of schooling (Basque, Spanish and English). A trilingual corpus of argumentative scientific writing essays was collected from a sample of 113 secondary education students. The texts were analysed with MultiAzterTest to retrieve complexity, accuracy and fluency measures. Correlational analyses were performed to explore correlations of each measure across languages, and low-moderate correlations were found between most measures and their counterparts. Specifically, accuracy and fluency measures showed stronger between-language relationships, which were especially salient between Basque and Spanish. Findings suggest that multilingual learners exhibit similar across-language patterns in the writing process, thus supporting Cummins' CUP. The emerging similarities have important implications for bi/multilingual education programs, as they might inform curriculum design and instruction to foster crosslinguistic transfer and metalinguistic multilingual awareness.

Keywords: Multilingualism, writing, CAF, common underlying proficiency, secondary education

Resumen: Este estudio pretende contribuir al campo de la escritura multilingüe y apoyar empíricamente la Hipótesis de la Competencia Subyacente Común (CUP) de Cummins mediante el análisis de redacciones en las tres lenguas de estudiantes del modelo de inmersión en Euskera. El objetivo principal de la investigación es explorar las relaciones entre las redacciones en las tres lenguas de escolarización: Euskara, Español e Inglés. El corpus analizado es un corpus trilingüe formado por las redacciones argumentativas sobre la disciplina de ciencias de 113 estudiantes de educación

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secundaria. Los textos se analizaron con MultiAzterTest para evaluar las dimensiones de complejidad, precisión y fluidez en cada lengua. Se realizaron análisis correlacionales para explorar las relaciones de cada medida entre los tres idiomas, y, principalmente, se encontraron correlaciones bajas y moderadas entre las medidas y sus contrapartes. En particular, las medidas de precisión y fluidez mostraron correlaciones más fuertes que las de complejidad, especialmente entre Euskera y Español. Los resultados sugieren la existencia de patrones similares entre las lenguas de los y las aprendices multilingües, lo que concuerda con la hipótesis de Cummins. Estas similitudes tienen implicaciones importantes para programas educativos bilingües y multilingües, en tanto que pueden orientar tanto el diseño como los modelos de instrucción para fomentar la transferencia entre lenguas y la conciencia metalingüística.

Palabras clave: multilingüismo, escritura, CAF, competencia subyacente común, educación secundaria

Zusammenfassung: Diese Studie zielt darauf ab, einen Beitrag zum Bereich des mehrsprachigen Schreibens zu leisten und Belege für Cummins' Hypothese der gemeinsamen Sprachkompetenz (CUP) zu liefern. Zu diesem Zweck wurden dreisprachige Texte von Sekundarschülern untersucht, die an einem baskischen Immersionssprogramm teilnehmen. Das Hauptziel dieser Studie besteht darin, die Zusammenhänge zwischen den Kompositionen der Teilnehmer (n=113) in ihren drei Sprachen (Baskisch, Spanisch und Englisch) zu untersuchen. Ein dreisprachiger Korpus von argumentativen wissenschaftlichen Aufsätzen wurde gesammelt. Die Texte wurden mit MultiAzterTest analysiert, um Komplexität, Korrektheit und Flüssigkeit zu messen. Korrelationsanalysen wurden durchgeführt, um die Korrelationen zwischen den einzelnen Messwerten zwischen den Sprachen zu untersuchen. Korrelationen zwischen Sprachen wurden festgestellt, insbesondere die Messungen zur Korrektheit und Flüssigkeit zeigten stärkere Korrelationen zwischen den Sprachen, vor allem zwischen Baskisch und Spanisch. Die Ergebnisse deuten darauf hin, dass mehrsprachige Lernende ähnliche sprachübergreifende Muster im Schreibprozess aufweisen, was Cummins' CUP unterstützt. Diese Ergebnisse haben wichtige Implikationen für zwei/mehrsprachige Bildungsprogramme, um den sprachübergreifenden Transfer und das metalinguistische mehrsprachige Bewusstsein zu fördern.

Schlagwörter: Mehrsprachigkeit, Schreiben, CAF, gemeinsame Sprachkompetenz, Sekundarstufe

Laburpena: Ikerketa lan honekin idazketa eleanitzaren arloari ekarpena egin nahi zaio eta Cummins-en Azpiko Gaitasun Komunaren Hipotesia (CUP) enpirikoki frogatu. Horretarako, murgiltze-ereduko bigarren hezkuntzako ikasleen idazlanak aztertu dira. Lan honen helburu nagusia da ikasleen hiru eskolatzeko hizkuntzen (euskara, gaz-

telera eta ingelesa) arteko eragina eta harremanak aztertzea. Lagina bigarren hezkuntzako 113 ikaslek osatzen dute, eta corpusa haiek euskaraz, gaztelaniez eta ingelesez ekoiztutako arloko argudio-testuekin sortu da. Corpusa MultiAzterTest tresnarekin aztertu da konplexutasuna, zuzentasuna eta jariotasuna neurtzeko. Neurri guztiekin korrelazio-analisiak egin dira hizkuntzen arteko harremanak aztertzeko, eta korrelazio baxu-ertainak aurkitu dira neurri gehienetan. Zuzentasun eta jariotasun dimentsioek erakutsi dituzte korrelazio indartsuagoak batez ere, bereziki euskara eta gaztelararen artean. Emaitzek erakusten dute ikasle eleanitzen idazketa patroiak antzekoak direla hiru hizkuntzetan, beraz, Cummins-en CUP hipotesia baieztatzen da. Aurkitutako antzekotasunek hezkuntza-programa elebidun eta eleanitzetarako ondorio esanguratsuak izan ditzakete, hizkuntzen arteko transferentziak eta kontzientzia metalinguistikoa garatzen duten kurrikulum eta esku-hartzeak diseinatze aldera.

Gako-hitzak: eleaniztasuna, idazketa, CAF, azpiko gaitasun komuna, bigarren hezkuntza

1 Introduction

Writing is essential to language learning and educational success (Manchón & Polio 2021; Gogolin 2018; Christie 2012). However, writing is also considered a complex literacy skill to be achieved and developed (Schnoor & Usanova 2023). Identifying developmental changes in language performance is a challenging matter for which objective indicators are required. To this end, complexity, accuracy and fluency (henceforth, CAF) have been proposed as a reliable construct in research in applied linguistics and language acquisition (Wolfe-Quintero et al. 1998). CAF measures have been long used to explore writing or oral performance, quality and/or development, as they provide a set of quantitative and objective measures that capture the characteristics of textual production, be that oral or written production (Muñoz & Tragant 2023).

The objective of this article, therefore, is to contribute to research focusing on the multilingual writing of secondary education students by exploring intra-individual correlations of complexity, accuracy and fluency in trilingual writing. Texts written in Basque (the language of instruction), Spanish (the majority language in the sociolinguistic context), and English (the first foreign language taught at school) are considered to this end.

1.1 Writing and CAF

The aforementioned CAF dimensions have been widely and long used for research purposes, as they provide quantitative indicators of language performance. Conse-

quently, several studies have employed them to explore language acquisition, writing quality or language learning (e.g., Crossley & Kim 2022; Lahuerta 2020; Orcasitas-Vicandi 2021; Crossley & McNamara 2014). Michel (2017:52) and Bulté and Housen (2012) argue that the CAF construct is “multifaceted, multi-layered and multidimensional in nature” and that complex and non-linear relationships between the dimensions take place.

Previous research has employed some or all of the dimensions of CAF, albeit differences in the definitions of the dimensions have appeared. Consequently, it is fundamental to properly define and operationalise the dimensions of CAF for research purposes (Bulté & Housen 2012), in order to facilitate the interpretation and comparability of results across studies. Phuoc and Barrot (2022) claim that the body of research including all three dimensions of CAF is scarce. In addition, some studies have focused on a single measure per dimension, which hardly captures the whole complex and multifaceted nature of the CAF construct. Therefore, in this study, we want to contribute to the already existing literature by analysing all dimensions of CAF in more than one language.

In order to establish an understanding of the dimensions of CAF for this study, each dimension of CAF requires proper definition. Complexity is understood as the variety and sophistication of the structures (syntactic and lexical) used by a writer (Lu 2017; Maamujav 2021; Crossley & McNamara 2014). Common measures for this dimension include the mean number of words per sentence, the degree of subordination or the measure of textual diversity (MTLD). Accuracy is defined by the production of error-free language and adhering to the rules of a particular language (e.g., Wolfe-Quintero et al. 1998; Bui & Skehan 2018; Lahuerta 2020), is normally operationalised by error counts, ratios or indices. Fluency, at last, refers to a writer’s ability to produce language, and their control over the production (Housen & Kuiken 2009). Fluency variables include total counts of utterances, such as the number of words, sentences or T-units, and ratios, e.g., number of words written per minute.

1.2 Multilingual writing

Cummins’ theories have contributed to how bi/multilingual education is understood nowadays. This paper is driven by Cummins’ theories of the Language Interdependence Hypothesis (LIH, 1979) and Common Underlying Proficiency (CUP, 1980, 2021). The LIH claims that positive transfer effects take place across one’s languages, as linguistic skills acquired in a certain language are transferred to the other languages of a speaker, which, therefore, facilitates the development of skills in the other languages. In fact, this implies the existence of CUP-specific aspects that are

common and that underlie or go beyond separate languages (Cummins 1980). Cook (1992) proposed the theory of *multicompetence*, which, in line with Cummin's proposals, suggests that multilingual individuals develop a complex and dynamic system of multiple linguistic competences that are interrelated to each other. More recently, Cenoz and Gorter (2011) proposed the *Focus on Multilingualism* approach, indicating the importance of considering a learner's whole linguistic repertoire when teaching and researching in multilingual contexts. They suggest that strong interactions between a person's languages exist and require consideration and that acquiring a certain subsystem in a language will affect a learner's other languages, often reinforcing them as a set of connected systems.

Although theories focused on bi/multilingualism have been extensively studied in the last decades, according to Rinnert and Kobayashi (2016), multilingual writing is still a relatively new topic in the field of second and third language writing. Research focusing on multilingual writers requires adopting a multilingual approach (Cenoz & Gorter 2011) instead of a monolingual lens, as the way in which multilingual speakers use their languages differs from how monolinguals do (Cenoz 2013). Therefore, a call for greater focus on multilingual writing has been made in order to address its particularities. In this paper, Rinnert and Kobayashi's (2016) model is adopted, which considers the whole linguistic repertoire of a writer, along with their previous knowledge and social and situational factors.

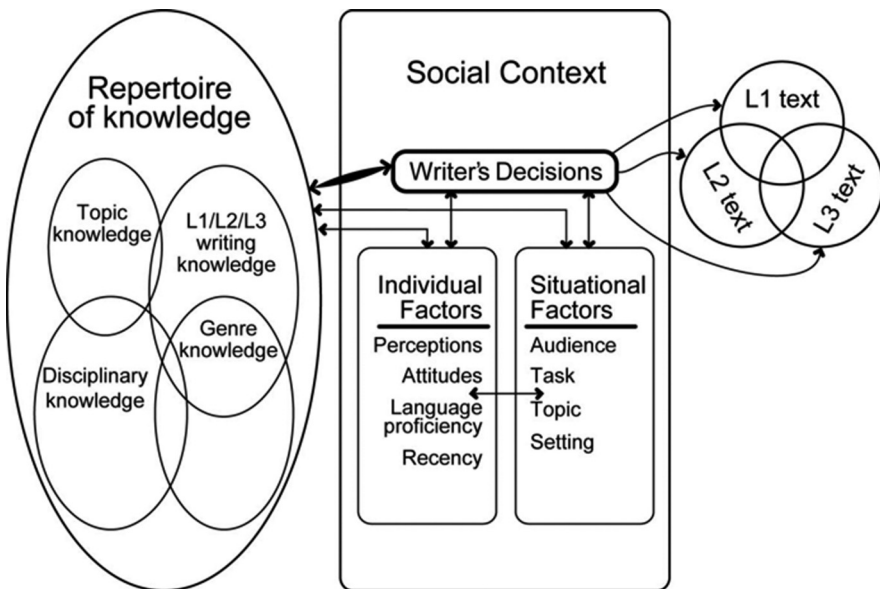


Figure 1: Rinnert and Kobayashi's (2016) multilingual writing model.

As can be seen in Figure 1, Rinnert and Kobayashi (2016) propose the repertoire of knowledge of a writer and the social context to be influential in the written outcomes. In this sense, beyond-language aspects such as disciplinary, topic, genre or writing knowledge (e.g., the use of paragraphs) affect the written product. In addition to those aspects, language-specific aspects, such as lexical and grammatical knowledge also play an important role in the writing process (Orcasitas-Vicandi 2018). Their model proposes overlapping features between L1, L2 and L3 writing where both commonalities and differences appear in the writing of a multicompetent writer.

Even if multilingual writing is a relatively new area (Rinnert & Kobayashi 2016), some studies have focused on the relationships across a writer's multilingual texts, often supporting Cummins' CUP and LIH. The following paragraphs will report previous findings regarding writing research in more than two languages, focusing on trilingual writing (e.g., San Isidro & Lasagabaster 2018; Orcasitas-Vicandi 2021; Cenoz & Gorter 2011), as many studies have found correlations between writers' three languages (e.g., Sagasta 2003; Schnoor & Usanova 2023).

Literature has found cross-linguistic influence (CLI) transfers in various domains (Orcasitas-Vicandi 2021; Goikoetxea 2008), such as at the lexical and syntactic levels. Studies exploring lexis- or syntax-level CLI have found that L3 writers often transfer words and terminology from their L1 or L2 (Orcasitas-Vicandi 2021; Goikoetxea 2008). Etxague Goia and van der Worp (2020) analysed trilingual writing in Basque, Spanish and English and found that L3 English texts tended to include more sentence-level CLI, while L1 and L2 texts often showed greater word-level transfers. Kobayashi & Rinnert (2013) suggested bidirectional influences between a participant's L1 and L3, Japanese and Chinese, respectively, probably due to typological factors. They also found L2 English as influencing the composing process in L1 Japanese. Overall, previous literature suggests that the boundaries between languages are soft and transfer is multidirectional (Cenoz & Gorter 2011). However, as Chau et al. (2022:4) claim, to date, most L3 research has focused on cross-linguistic influence effects regarding "low level-components of language, such as the lexicon or syntax". Still, other measurements have been used to explore multilingual writing, such as holistic ratings, procedural and discourse aspects of language, or CAF measures.

Studies focusing on holistic scorings of multilingual writing have found similarities and correlations between multilingual writers' texts. Cenoz and Gorter (2011) analysed compositions in Basque, Spanish and English using a holistic rubric. They scored student compositions based on content, organisation, grammar, vocabulary, mechanics and the total score for each text, and found that all scores except for organisation were correlated across languages with low-to-medium correlation scores. Using the same rubric, Orcasitas-Vicandi (2021) found all ratings to be correlated between Basque, Spanish and English. In her study, correlations between Basque and Spanish were the strongest (all ranging between $r=.474$ and $r=.572$). Never-

theless, using the same rubric, Etxague Goia and van der Worp (2020) only found correlations in the content score between Basque and Spanish, language use between Basque and English and overall scoring between Spanish and English.

Other studies have focused on aspects related to transfers at discourse, procedure or strategy levels, as writing strategies are easily transferred between languages (Forbes 2022), especially between a learner's FLs (Forbes & Fisher 2018). Chau et al. (2022) explored source-based writing tasks with MA students in L1 Dutch, L2 English and L3 French, and claim that the processes of writing and using sources are similar across languages, as higher-order skills are activated. Pragmatic aspects of language have also shown positive across-language relationships (e.g., Pagola 2010; Martín-Laguna 2022; Martín-Laguna & Alcón-Soler 2018). Similarities across L1/L2 (Spanish or Catalan) and L3 (English) in the use of discourse-pragmatic markers have been found by Martín-Laguna and Alcón-Soler (2018), and they suggest that these correlations consolidate over time, particularly in the case of hedges such as *maybe*, *in my opinion* or *I think* (Martín-Laguna 2022). Similarly, Pagola (2010) argued that a text's structure is directly transferred from one language to another after instruction.

However, for the purpose of this study, it is especially important to consider research that has examined correlations regarding CAF measures across trilingual writing. Sagasta (2003) explored Basque-Spanish bilingual students' compositions in their three languages: Basque, Spanish and English. She utilised the four main dimensions of the CAF construct, using one measure for each dimension. Overall, positive correlations were found across languages, however, when participants were divided according to their L1 (Basque or Spanish), she found stronger correlations across languages in the case of learners who had Basque as their L1. They showed positive medium to strong correlations between all language pairs and all measures. Those who had Spanish as their L1 also showed medium to strong correlations between Spanish and Basque, however, Basque-English scores were not correlated, except for low correlations between syntactic complexity in Basque and English. More recently, Orcasitas-Vicandi (2021) examined the same languages with secondary education students in the Basque Country, focusing on accuracy measures. She found that small-medium correlations were found in accuracy measures, with the strongest correlations in lexical errors, run-on sentence errors and error per word ratios. Egli Cuenat (2017, 2022) found text length to be correlated across German (L1), English and French (the FLs). Low correlations were also found in the number of subordinates between L1 and English and between the two FLs. In addition, in her 2017 study, she found higher between-language correlations in the case of early learners of English. Participants showed greater correlations between languages as they progressed to secondary education, showing moderate-high correlations in fluency (Egli Cuenat 2022). Yang & Sun (2015) also examined trilingual writing and only found significant correlations between L1 and L3 accuracy.

On the whole, most studies have found some kind of positive correlation across the writer's three languages. The majority of studies reported here, however, have used general language topics in their writing (e.g., Sagasta 2003; Cenoz & Gorter 2011), such as picture description (e.g., Orcasitas-Vicandi, 2021) or writing a recipe (e.g., Sagasta 2003). As Pérez-Vidal and Lasagabaster (2021) argue, writing about general topics does not allow learners to use their full potential when writing about school matters, i.e., disciplinary writing. Some studies have explored disciplinary writing tasks and found similarities across languages (see for example, from a SFL perspective in bilingual writing Llinares & Nashaat-Sobhy 2021; Evnitskaya & Dalton-Puffer 2023). However, research on multilingual disciplinary writing from a CAF perspective is scarcer. Although not trilingual, Granados et al.'s (2021, 2022) studies focus on bilingual disciplinary writing, exploring the correlations of student compositions between L1 Spanish and L2 English. Their findings seem to confirm Cummins' CUP theory and propose that a similar pattern in the development of academic language occurs across a speaker's languages.

Rinnert and Kobayashi (2016) call for more research in order to understand the different roles of a writer's repertoire when writing. The purpose of this article, therefore, is twofold, as it aims to explore all three CAF dimensions, on which scant focus has been placed (Phuoc & Barrot 2022). In this sense, it is intended to expand previous trilingual writing research and update Sagasta's (2003) results in a similar context by considering CAF's multilayered nature (Michel 2017, Housen & Kuiken 2012) and by using a variety of measures for each dimension. In addition, as has been mentioned before, multilingual disciplinary writing needs to be further explored. The recent study by Granados et al. (2022) focused on the language of History in bilingual writing. In order to further contribute to the topic of disciplinary writing, this study focuses on the discipline of Science.

Therefore, considering previous findings and the aforementioned general objectives, this study set out to answer two main research questions related to the correlations of CAF measures across students three languages:

- RQ1) Are syntactic complexity, lexical complexity, accuracy and fluency measures correlated across Basque, Spanish and English?
- RQ 2) What patterns of syntactic complexity, lexical complexity, accuracy and fluency features emerge in multilingual learner texts across three languages?

2 Methodology

2.1 Sample

This cross-sectional study was conducted in four state-funded schools in the Basque Autonomous Community (BAC). All four schools taught through a Basque immersion D model programme (for a characterisation of the Basque education system see Cenoz 2023). The sample consisted of 112 Year 8 (13-14-year-old) students, after excluding participants who were absent in at least one data collection point.

All four schools selected use the same teaching methodology and materials, and the assessment and curriculum they follow are the same. In order to control for potential differences in terms of language proficiency between schools, participants were tested in Basque, Spanish and English with a LexTale test (Lemhöfer & Broersma 2012; de Bruin et al. 2017; Izura et al. 2014). In the test, participants were asked to indicate if words from a list are real words or pseudowords. After performing the test in the three languages, each participant was given a numerical score ranging from -1 to 1. All scored higher in Spanish ($M=0.66$, $SD=0.2$) than in Basque ($M=0.55$, $SD=0.15$) and English ($M=0.17$, $SD=0.16$). T-tests showed no difference between schools (all $ps > 0.3$), and, consequently, a similar language proficiency baseline can be assumed.

Permission was obtained from legal guardians, and students were informed about the nature of the study. They were told that they would be required to write three texts about renewable energies in three languages and that the data were only collected for research purposes.

2.2 Instruments and procedure

Participants were asked to write three texts before having covered the topic in class. They were required to write an argumentative letter in Basque, Spanish and English in which they had to define renewable energy sources and argue in favour of using them at their schools. The prompts were similar across languages. Tests were completed on a computer under individual testing conditions, as participants were explicitly told not to use online resources such as dictionaries, translators or external information. Teachers and researchers were present during data collection to oversee the testing conditions and ensure that all participants followed instructions and avoided cheating.

In order to control for the potential effect of the order of completion of the texts, it was counterbalanced. Accordingly, participants in each class were divided into three sections and each received instructions in the designated language. Therefore, students undertook the tests in either of these sequences: Basque-Span-

ish-English, Spanish-English-Basque or English-Basque-Spanish. This helped minimise the effect of the order of text completion. An ANOVA was conducted to ensure differences among the three sequences, and the results showed no statistically significant differences in any of the measures (all $ps > 0.1$).

2.3 Data analysis

Texts produced by students were aligned by participant and language (BA, SP, EN). The texts were then analysed with MultiAzterTest (Bengoetxea et al. 2020). MultiAzterTest is a multilingual computational linguistics tool that provides quantitative linguistic measures of a given text in Basque, Spanish and English. Although powerful tools have been used in the literature to analyse CAF measures, the majority are mainly available for texts written in English, and some of them in Spanish. In contrast, MultiAzterTest provides the opportunity to explore text characteristics in Basque, Spanish and English. Consequently, it has been used in previous studies to track language development (Granados et al. 2022; Imaz Agirre et al. (under review)). Based on previous literature, and considering that only a number of measures provided by the tool are available in all three languages, a total number of 16 measures were retrieved: five measures for syntactic and lexical complexity, and three for fluency and accuracy. Table 1 shows a summary of the measures used for each dimension of CAF.

Table 1: a summary of the measures used in each dimension.

| Dimension | Measures analysed |
|----------------------|--|
| Syntactic complexity | <ul style="list-style-type: none"> – Mean number of modifiers per noun phrase – Number of subordinates – Mean length of sentence (words per sentence) – Logical connectives – Causal connectives |
| Lexical complexity | <ul style="list-style-type: none"> – MTLTD – Number of rare content words – Number of rare distinct content words – Semantic similarity between adjacent sentences – Semantic similarity between all pairs of sentences |
| Accuracy | <ul style="list-style-type: none"> – Number of total errors – Error per word ratio – Error per sentence ratio |
| Fluency | <ul style="list-style-type: none"> – Number of words – Number of sentences – Number of paragraphs |

It is important to mention that MultiAztertest does not provide accuracy measures, and, consequently, the authors coded each text for accuracy. In the coding process, all errors produced by students were quantified. Previous research has not specified clear counting criteria for repeated errors, consequently, authors counted as separate errors those produced more than once errors instead of being coded as a single error, as this is the most common criteria in school context assessments. Errors related to subject content were not coded unless they produced incoherence or inability to understand the text. Therefore, spelling, typographical, coherence, syntactic and lexical errors were coded.

MultiAztertest scores were later introduced in JAMOVI for statistical analysis. In order to analyse cross-linguistic patterns across Basque, Spanish and English, Pearson correlations were conducted for each measure to explore potential correlations between all language pairs.

3 Results

Two distinct and interconnected research questions are addressed here, with RQ 1 pertaining to a quantitative understanding of the correlations across languages, and RQ 2 exemplifying the main features of each dimension. In order to facilitate delving in-depth into each dimension individually, the results are reported per dimension.

3.1 Syntactic complexity

Some syntactic complexity measures were correlated across languages (cf. Table 2). The mean number of words per sentence in Basque was significantly correlated with the mean number of words in Spanish and English, but no correlation was found between Basque and English. Furthermore, positive weak-moderate correlations were found in the use of subordinates across languages, with Basque-Spanish being the strongest correlation and those including English being marginally significant. A negative correlation was found between the number of modifiers per noun phrase in Basque and Spanish. The number of logical connectives in English was correlated with the Spanish and Basque counterparts. No correlations were found in causal connectives.

Table 2: Correlations between Basque, Spanish and English syntactic complexity measures.

| MEASURE | Correlation | | | | | |
|--------------------------------|---------------|------------------|--------------|------------------|--------------|--------------|
| | BA-SP | <i>p</i> | BA-EN | <i>p</i> | SP-EN | <i>p</i> |
| Mean N of words in sentences | 0.259 | 0.006 | 0.351 | <0.001 | 0.134 | 0.156 |
| N of subordinate clauses | 0.349 | <0.001 | 0.172 | 0.068 | 0.183 | 0.053 |
| N of modifiers per noun phrase | -0.191 | 0.042 | -0.039 | 0.683 | -0.029 | 0.761 |
| Logical connectives | 0.142 | 0.133 | 0.209 | 0.026 | 0.210 | 0.025 |
| Causal connectives | 0.045 | 0.636 | -0.064 | 0.498 | 0.171 | 0.069 |

* BA: Basque; SP: Spanish; EN: English

These patterns can be observed in the example in Table 3, which shows a similar paragraph structure in the three languages. Except for the text in Basque (which contains two sentences), texts in Spanish and English are organised in a single very long sentence, and the text in Basque includes two long sentences. The student in the example used many subordinate clauses in their three texts, along with the presence of a high word/sentence ratio. Overall, no correlation was found in the use of causal connectives across languages, as students used very limited causal sentences in Basque and rather employed logical connectives. As can be appreciated in the example, the student only used logical connectives to link their ideas in Basque, however, the use of causal linkers is salient in the text in Spanish, with *ya que* or *porque*, ‘because, since’ being the most common connectives. The text in English shows a mixed use of both types of connectives. Most students tended to use simple connectives in English such as *because* and *and*, while their Spanish compositions showed greater variety in the type of connectives used.

Table 3: Trilingual examples of lexical complexity.

| | |
|-----|---|
| Lg. | Unaltered examples from the corpus. Causal connectives are in bold, and logical underlined. |
| BA | Eguzki-plakak jartzen baditugu, eguzkia egiten duenean, eguzki plakei emango die, <u>eta</u> hortik guk elektrizitatea lortuko dugu, <u>eta</u> ez da beharrezkoa izango ordaintzea. Gainera , esaten dute horrela interneta hobeto doala <u>eta</u> ordenagailuak erabitzen ditugunean ikastolan, ez dute izango problemarik konekzioarekin, <u>horrela</u> ez ditugu problemarik edukiko, <u>eta</u> azterketak egiterakoan ordenagailuarekin hobeto aterako dira, <u>eta</u> zuek diru gutziago ordaindu bahrko zenuketeen. |

Table 3: (continued)

| | |
|-----|--|
| Lg. | Unaltered examples from the corpus. Causal connectives are in bold, and logical underlined. |
| SP | Yo creo que se deberían utilizar las energías renovables porque al parecer no contaminan y no se terminan porque como esta energía es renovable, se pueden renovar constantemente, y no hace falta cambiarlas, yo creo que sería lo más cómodo para todos usar las energías renovables, a pesar de eso, <u>también</u> nos ayudara en los gastos, ya que solo necesitamos una de esas energías para que nos bajen las cuotas a todos de la escuela, yo creo que la energía nos llegara muy bien, ya que las energías renovables son aquellas que crean una fuente de energía que no se terminan, <u>y</u> a eso se le dice que es un ejemplo de una energía. |
| EN | <u>In my opinion</u> , we need to use the renewable energy in our school. It is very well, because you don't need to pay a lot of, <u>and</u> if you choose and other you have to pay more and the internet is not the best, I think that the better is the renewable energy, yo don't need to pay a lot of, <u>and</u> the internet is very wonderful, because if you choose a other energy to don't pay more, you have to pay more and the best for pay "gutxiago" is the renewable energy, because you don't need to change anything, because this energy is renewable and you don't need to change. |

3.2 Lexical complexity

Regarding lexical complexity measures, as shown in Table 4, some correlations across languages were found. Low correlations between Basque and Spanish were found in the MTLT and semantic similarity between adjacent sentences. Low significant correlations between Basque and English were also found in the number of rare content words. Semantic similarity between all pairs of sentences was significantly correlated across languages.

Table 4: Correlations between Basque, Spanish and English lexical complexity measures.

| MEASURE | Correlation | | | | | |
|--|--------------|------------------|--------------|--------------|--------------|--------------|
| | BA-SP | <i>p</i> | BA-EN | <i>p</i> | SP-EN | <i>p</i> |
| MTLD | 0.218 | 0.02 | 0.124 | 0.189 | 0.086 | 0.363 |
| N of rare content words | 0.159 | 0.093 | 0.211 | 0.025 | 0.031 | 0.747 |
| N of distinct rare content words | 0.019 | 0.845 | 0.126 | 0.185 | 0.004 | 0.970 |
| Semantic similarity between adjacent sentences | 0.262 | 0.005 | 0.080 | 0.402 | 0.129 | 0.174 |
| Semantic similarity between all pairs of sentences | 0.347 | <0.001 | 0.196 | 0.037 | 0.242 | 0.010 |

Overall, not many lexical complexity measures reached statistical significance. Low-moderate correlations were found in semantic similarity between all pairs of sentences. Example in Table 3 above shows that sentences are content-related to each other, therefore being semantically correlated. This pattern can be observed in the three languages.

One interesting finding in the area of the lexicon used by students is the high presence of CLI borrowings in the texts in English. For instance, verbatim example in Table 5 shows some transfers from either Basque or Spanish at the lexical and syntactic level. At the lexical level, the student used adapted loan words from the other two languages, mainly Spanish: *renobable* ‘renewable’, *aparates* ‘devices’, *ahorrate* ‘save (money)’ or *sunlight places* ‘solar panels’. These are directly borrowed from Spanish, the language in which participants showed a higher proficiency. Interestingly, texts in Basque and Spanish did not show CLI transfers at the word level.

Table 5: Example of CLI transfers in a text in English.

| Lg. | Example of lexical borrowing from the corpus, in English. Transfers underlined. |
|-----|--|
| EN | <p>To have <u>renobable</u> energy for the green school you have to put on the school sunlight <u>places</u> for the sunny to renewable energy. Then <u>put</u> the window open for the light enter for the class an <u>illuminate</u> for <u>light natural</u>.</p> <p>Then the class use the energy to <u>renobable</u> to renewble the <u>clas</u> and ahorrate the energy to the school. Later, the <u>electronic aparates</u> in the scool in the moment when you dont use you <u>desenchuface</u> the electronic <u>aparates tu</u> renewable energy for the school.</p> <p>Then renewable enery you use <u>water natural</u> for renowabl energy. You put a one <u>aparat</u> to <u>ahorrate</u> energy and then renewable the water.</p> <p>Finally to <u>ahorrate</u> energy you <u>utilice</u> the natural gas or the <u>calefaction</u> natural to <u>ahorrate</u> energy and to pay less to the <u>calefaction</u> or more energy.</p> |

3.3 Accuracy

Almost all accuracy measures were significantly correlated to each other, with two combinations being almost significant at $p=0.055$ and $p=0.059$ levels, as can be seen in Table 6. The strongest correlations were found between Basque and Spanish in all three accuracy measures.

Table 6: Correlations between Basque, Spanish and English accuracy measures.

| MEASURE | Correlation | | | | | |
|--------------------------|--------------|------------------|--------------|------------------|--------------|--------------|
| | BA-SP | <i>p</i> | BA-EN | <i>p</i> | SP-EN | <i>p</i> |
| Total errors | 0.408 | <0.001 | 0.322 | <0.001 | 0.181 | 0.055 |
| Error per word ratio | 0.415 | <0.001 | 0.218 | 0.020 | 0.233 | 0.013 |
| Error per sentence ratio | 0.472 | <0.001 | 0.178 | 0.059 | 0.257 | 0.006 |

Examples in Table 7 show the same student's three texts. They made considerable errors in the three languages, thus supporting the correlations in accuracy measures. As can be seen in the examples, many of the errors produced by the student, irrespective of language, are spelling errors. Overall, the student shows difficulties with the placement of the letter *h*, which is unpronounced in Spanish and Basque. In addition, participants' texts normally found it challenging to differentiate between homophone sounds, or phonetically similar sounds, such as *b* and *v* in Spanish, or *z* [s] and *s* [ʃ] in Basque. In English, the majority of spelling errors could be coded as CLI transfers at the spelling level, with traditionally Basque or Spanish spellings being present. Texts in English also showed syntactical errors regarding adjective clauses, in which participants tended to use the linguistic structure from either Basque or Spanish (e.g., *light natural*, Table XXX), where the adjective comes before the noun it refers to. In addition, Spanish accentuation marks were especially challenging for students, as example in Table XXX shows.

Table 7: Trilingual examples of accuracy.

| | |
|-----|--|
| Lg. | Trilingual accuracy examples from the corpus. Errors are underlined. |
| BA | Guraso agurgarriok, <p><u>idatzi</u> honen bitartez zuen laguntza eskatzen dizuegu, gure ikastolak energia berriztagarriak erabiltzea nahiko luke eta zuen baieztapena behar dugu, <u>obeto</u> <u>adaptatzen</u> de energia berriztagarria panel solarrak dira, <u>arrazateko</u> unibertsitateak ikertu duen <u>bazala</u> gure kliman eta gure inguruan hobeto <u>adaptatzen</u> dena hau da. <u>Nozki</u> gure ikastolak behar duen energia oso handia da eta 50000 euro baharko genituzke, <u>nozki</u> zuen laguntza behar dugu eta gu <u>%38-a</u> ordainduko dugu, zuek 100 euro <u>geihago</u> eman beharko dizkiguzue. <u>Bahina</u> dena ez dira izango berri txarrak, zuek 100 euro horiek aurreztuko dituzue <u>24egunetan</u> hau da, 135 euro gutxiago ordainduko dituzue hilabetero. Zuen <u>semeak</u> eskertuko <u>dizkizuet</u>e aurreztuko dugun diruarekin materiala erosiko dugulako.</p> <p>Besterik gabe,</p> |

Table 7: (continued)

| | |
|-----|---|
| Lg. | Trilingual accuracy examples from the corpus. Errors are underlined. |
| SP | <p>Buenos <u>días</u> ministerio, <u>en</u> nuestra escuela estamos intentando utilizar <u>energias renovables</u>, ya que necesitamos ahorrar un poco <u>mas</u>, como ya <u>sabreis</u> necesitamos <u>buentra financiacion aqui</u> os dejo unas razones por las que nos <u>deberiais dejar utilizarlas</u>:</p> <p>El ahorro de dinero, al utilizar <u>energias renovables</u> nuestro gasto mensual <u>disminuiria</u> un <u>80 %</u> aproximadamente, esa gran suma de dinero se <u>pueden</u> utilizar bien para <u>renobar</u> material <u>escolar ordenadores</u>, pizarras... o bien al principio utilizar ese dinero para recuperar el dinero gastado en las placas solares.</p> <p>Como ya te he explicado anteriormente al ahorrar utilizando las <u>energias renovables</u> se pueden comprar material necesario, como ya <u>sabreis</u> los colegios son fundamentales para la <u>desarrollacion</u> del cerebro, para aprender conceptos nuevos e incluso para facilitar los años de estudios universitarios y sin material escolar <u>seria</u> algo <u>dificil</u> por no decir casi imposible aplicar los conceptos dichos anteriormente.</p> |
| EN | <p>Dear <u>euorpean commisson</u>, <u>in</u> our school we have used <u>around</u> 40 years non-renewable energies and we think <u>thar</u> it is <u>soo</u> <u>necesary</u> to empathize with the environment and while we are at it we save some money to use <u>to other thinks, necesary thinks</u>. We think that the schools are very very <u>inportant</u> for the mental development. <u>Nowedays</u> we think electricity or other energies like the <u>petroleo</u>, gas... For our <u>live</u>: charge our <u>mobile</u> phone, charge a car, charge a computer ... In our schools we have to save money because with the books, the salary of the teachers, <u>povertors</u>, broken things... They are a lot of things and with this special and perfect <u>eneqi</u> we can use all the <u>thigs</u> that I <u>say</u> before and maybe we have some money to <u>desconect</u> and go to a <u>scape</u> room, a park...</p> |

3.4 Fluency

Lastly, low-medium correlations were found between all possible combinations among the fluency measures. Findings show that the correlations of number of words and sentences are stronger between Basque and Spanish than in the combinations involving English. Conversely, for the number of paragraphs, the correlation is stronger between Spanish and English.

Table 8: Correlations between Basque, Spanish and English fluency measures.

| MEASURE | Correlation | | | | | |
|----------------------|-------------|----------|-------|----------|-------|----------|
| | BA-SP | <i>p</i> | BA-EN | <i>p</i> | SP-EN | <i>p</i> |
| Number of words | 0.476 | <0.001 | 0.390 | <0.001 | 0.409 | <0.001 |
| Number of sentences | 0.424 | <0.001 | 0.353 | <0.001 | 0.405 | <0.001 |
| Number of paragraphs | 0.390 | <0.001 | 0.350 | <0.001 | 0.475 | <0.001 |

Said correlations can be observed in the examples in Table 9. Texts are very similar in terms of structure, which shows parallelisms in fluency measures. Long sentences (between 9 and 11) arranged in multiple paragraphs (between 6 and 8) in each language are presented. Regarding the number of words, and accounting for typological differences between the languages, all texts were long, with a number of words ranging from 232 in Basque to 306 in Spanish, with 243 words in English. The lower number of words in Basque is due to typology, as Basque is an agglutinative language and conveys more morphological meaning in less words.

Table 9: Trilingual examples of fluency.

| Lg. | Trilingual fluency examples from the corpus |
|-----|--|
| BA | <p>Guraso agurgarriak,</p> <p>Jakin denez, azken hilabeteetan ikastolaren elektrizitate faktura igo egin da, eta Europan azaldu den Europako Batzordeak Green School plana aurkeztu da baliabide bezala. Plan hau duen helburua da Europako eskola guztiatan energia berriztagarriak erabiltzea. Energia berriztagarriak energia sortzeko iturri amaitezinak erabiltzen dituzten energia itur naturaleri esaten zaie.</p> <p>Alde batetik, energia berriztagarriak natura kaltetu gabe energia iturri amaitezina da. Petrolioa edota beztelako energia iturri ez-berriztagarriak ez bezala, erabiltzen den metodoa ez diote ez animaliei, ez aireari, ez ozono geruzari, ez gizakei eta ezta ekosistemei kalterik egiten.</p> <p>Beztetik, energia itur amaitezinak dira, eta ez dira inoiz bukatuko, ikatza edota beztelako energia itur ez-berriztagarriak noizbait bukatuko dira, adibidez petrolio geroz eta gutxiago airkitzen ari da; aitzitik, energia iturri amaitezinak, beraien izena dioen bezala, amaitezinak dira. Ura adibidez, ez da inoiz bukatuko, planetaren %70 ura da, eta gainera kea egiterakoan, milloika urte atzera gertatu zen bezala, ke hori pilatzen denean euri bilakatuko da eta berriz ere ura eukiko genuke.</p> <p>Bukatzeko, egia da batzuetan energia iturri berriztagarriak ezin dutela energia iturri ez-berriztagarriak egiten duten lana egin; alabaina, energia iturri berriztagarriak energia iturri ez-berriztagarriak baino lan naturalagoa eta ez hain kutsakorak dira eta ez dute inguruneari kalterik egiten.</p> <p>Ondorioz, energia berriztagarriak erabiltzea energia iturri hobea da eta energia iturri ez-berriztagarriak baino eta Europako Batzorderen Green School planean parte hartzea hobeto egingo du bai ikastolarentzat bai planetarentzat. Espero dut konbentzitu izana hau irakurrita.</p> |
| SP | <p>Al Ministerio de Medio ambiente, buen día.</p> <p>En nuestra ikastola ha surgido un tema el cual querríamos tener su financiación para poder desarrollar. La conversación fue acerca de formar parte en el proyecto de el Comité Europeo “Green School”, el cual tiene como objetivo que todas las escuelas utilicen energía renovable.</p> <p>En primer lugar, las fuentes de energía renovables, tal y como su nombre indica, pueden renovarse tanto como se desee y no se acabarán, lo que hace que sean mucho mas respetuosas con el medio ambiente y no contamina tanto como otras fuentes de energía tales como el petroleo o la energía nuclear.</p> |

Table 9: (continued)

| | |
|-----|---|
| Lg. | <p>Trilingual fluency examples from the corpus</p> <p>Continuando con el tema, las fuentes de energía renovables son mucho menos contaminantes que las fuentes de energía no-renovables, ya que, por ejemplo, al quemar carbón o petróleo, además de obtener energía, se liberan partículas contaminantes las cuales destruyen la capa de ozono y dañan el sistema respiratorio tanto de los humanos como de los animales.</p> <p>Para finalizar con el tema, es cierto que hay algunos casos específicos en el que la energía no-renovable es la única opción o es más funcional que las energías no renovables; sin embargo, las fuentes de energía como el agua o la luz del sol cada vez se desarrollan más y son más funcionales, además de que son mejores si hablamos económicamente.</p> <p>En conclusión, el proyecto “Green School” traerá mejoras no solo al colegio, si no a el medio ambiente, las personas, los animales, y a la economía. Además de que son una fuente de energía que nunca se acabará por lo tanto no hay que preocuparse por la cantidad, al contrario que, por ejemplo, el petroleo, que cada vez se encuentra menos y se está terminando.</p> <p>Espero que con esta carta los haya convencido para financiar el proyecto para el colegio.</p> <p>Adiós.</p> |
| EN | <p>For the European Commission, my greates greetings.</p> <p>In our school we have think about been part of a proyect called “Green School”. The proyect’s target is to make that every school to use renewable energy sources, to help to the environment.</p> <p>To start, the renewable energy sources, as their name says, they are renewable, that means that they won’t finish because they are always being replaced or renewed, not as other energy sources like petroleum,that is dessapearing and they aren’t founding early nothing.</p> <p>Secondly, the renewable energy sources are more respectfull whith the environment and they don’t pollute, not as petroleum or nuclear energy, that to get or use them you have to born them, and because that, when they burn them they make toxic particles that pollute the envoirment, the ozone layer and also the animal’s and human’s breathing system.</p> <p>Finaly, it is true that un-renewable energy sources are used with some things that can not use renewable energy; nevertheless, te renewable energy sources are evolving and it can make more things and it also they are looking for to make renewable energy sources make that things that are only made by un-renewable energy sources.</p> <p>In conclusion, the renewable energy sources are more usefull that un-renewable energy sources and are better to help the envoirment and all the planet. Also they are better if you think it looking to the economy.</p> <p>Goodbye.</p> |

4 Discussion

The present study has focused on analysing the correlations between CAF measures in subject-specific compositions produced by trilingual secondary education students in the BAC. Measures of complexity, accuracy and fluency were analysed in the three languages following previous research (e.g., Sagasta 2003; Granados et al. 2021), and Pearson correlational analyses were performed to answer the two research questions proposed. As with the results section, findings will be discussed per dimension, followed by a general discussion.

Regarding syntactic complexity, some measures showed positive correlations across languages. However, except for the measure for semantic similarity between all pairs of sentences, no correlation reached statistical significance in all three combinations. Findings partially support previous literature suggesting correlations in syntactic complexity. Results regarding the correlations between Basque and Spanish and Basque and English in the mean number of words per sentence are consistent with Sagasta's (2003) work, however, no correlation was found between Spanish and English, which diverges from Sagasta's study. In line with previous research, correlations were found in the number of subordinate sentences (Egli Cuenat 2017; Granados et al. 2021), but only between Spanish and the other two languages. Subordination is established at B1-B2 levels (Chen et al. 2020), which aligns with the expected proficiency in Basque and Spanish of the participants, with English being somewhat lower to that threshold. In addition to the complexities of subordination per se, the syntactic system of the Basque language poses challenges to learners, as subordination is also accompanied by verbal case inflection. In the case of connectives, this study differs from the findings of Egli Cuenat (2017), who reported positive correlations in the number of connectives between participants' L1 and their two FLs. In fact, findings show low correlations only in the use of logical connectives between English and Spanish, as well as between English and Basque, but no significant correlation was observed for causal connectives. This supports Granados et al., (2021) who similarly reported no correlations in the number of connectives. Regarding the number of modifiers per noun phrase, a negative correlation was found between Spanish and Basque. This measure is dependent on language proficiency level (Lorenzo et al. 2019), which would explain the lack of correlation, as participants' proficiency in the three languages differed significantly.

With regard to the dimension of lexical complexity, the MTLTD showed positive correlations between Basque and Spanish. However, these require to be considered with caution due to the limitations of MultiAzterTest, which fails to differentiate between declined and not-declined words in Basque, and, therefore, the MTLTD in Basque is always high. The number of rare content words in Basque and English was correlated, but no other correlation was found. This suggests that subject-spe-

cific vocabulary, such as writing in the discipline of science, pose challenged that limit students' production of rare content words in the three languages. However, one measure (semantic similarity between all possible sentences) indicated correlations between all languages. The measure shows the cohesion among sentences across the whole text, and correlations might suggest that students have "certain control of the means of cohesion: ellipsis, substitution and reference systems" (Granados et al. 2022:15). This might indicate that students develop a certain level of cohesion needed to perform written compositions in all three languages, which further supports Cummins' CUP (1980, 2021) and Rinnert and Kobayashi's model (2016). Importantly, our study highlighted the high presence of CLI transfers mainly at the lexical level, in line with previous research (Cenoz & Gorter 2011; Orcasitas-Vicandi 2021; Goikoetxea 2008). This suggests that students faced challenges when accurately incorporating words in their less proficient language (English) and were influenced by previous lexical knowledge in Basque and Spanish. In many cases, this led to a great number of spelling errors in the texts.

Accuracy-wise, correlations were found between all possible combinations, thus confirming correlational patterns in the accuracy dimension, in line with previous research (Orcasitas-Vicandi 2021; Yang & Sun 2015; Sagasta 2003). Participants in our sample produced more errors per sentence than those in the studies by Orcasitas-Vicandi (2021) and Sagasta (2003), probably due to the subject-specific nature of the prompt, which contrasts with the more general topics in their studies. Although errors were not categorised, students showed a similar pattern in all of the languages in the type of errors produced, with spelling errors being the most common, in line with Orcasitas-Vicandi (2021) and Lahuerta (2020). Nonetheless, the source of the errors seems different when the three languages are compared. The most common error in English was due to CLI transfers (Orcasitas-Vicandi 2021; Goikoetxea 2008; Etxague Goia & van der Worp 2020) and writing words as they are pronounced phonetically (e.g., *dengerus* for 'dangerous'). In Spanish, most of the spelling errors were related to the Spanish language accent mark, such as in the word *energía* 'energy', which appeared to be one of the most common in all the languages; and texts in Basque showed students' difficulties to distinguish words written with *z* and *s*, as they are phonetically equal in some contexts.

Lastly, fluency measures also showed to be correlated with their counterparts. Although texts in Basque were shorter due to its agglutinative nature, students who wrote longer texts in one language also tended to write longer texts in the other. Findings are in line with previous research (Egli Cuenat 2022, 2017; Sagasta 2003; Granados et al. 2021). Fluency measures are normally positively correlated with the control of the language system (Lorenzo et al. 2019), yet they might not be as language-specific as complexity measures. Indeed, the fluency dimension entails mea-

asures that are more text- and discourse-related, and textual aspects are more likely to be transferred between languages (Granados et al. 2021). This effect is directly linked to discourse and pragmatic competence, which is transferred across languages (Martín-Laguna 2022; Martín-Laguna & Alcón-Soler 2018) and affects the structure of the texts (Pagola 2010).

Taken together, the findings of this study, in line with previous research (Etxague Goia & van der Worp 2020, de Angelis & Jessner 2012; Orcasitas-Vicandi 2021; Cummins 1980; Forbes 2022; Schnoor & Usanova 2023), provide support for the existence of common crosslinguistic patterns and the transfer of academic writing skills across languages. Hence, these findings support the claim that multilingual and multicompetent writers (Cook 1992) exhibit similarities in their compositions, confirming Rinnert and Kobayashi's (2016) model. Therefore, the results align with Cummins' CUP and LIH, affirming the interconnectedness and relationship across one's languages, which results in transferring certain aspects between them (Granados et al. 2021).

In addition, the study revealed that some dimensions of CAF were more easily transferred across languages than others: accuracy and fluency showed stronger positive correlations overall when compared to both complexity dimensions. This indicates that measures related to accuracy and fluency are probably more readily transferred between languages. Another possible explanation for this might be that students tend to focus on accuracy and fluency due to the demands of the academic context, which requires learners to write error-free compositions. Furthermore, findings also indicate that correlations between the first and second language (Basque/Spanish) were stronger than those combinations that included L3 English. This is in line with previous studies including these three languages (Orcasitas-Vicandi 2021; Sagasta 2003), however in contrast with Cenoz and Gorter (2011), who showed stronger correlations in holistic measures between English and either Basque or Spanish. The stronger relationship between L1 and L2 might be explained by the higher levels of proficiency, as when the proficiency in a language increases, crosslinguistic effects are more likely to happen (Egli Cuenat 2022).

5 Conclusions

In sum, the findings of this study indicate that multilingual learners exhibit crosslinguistic writing patterns (Cummins 1980; Rinnert & Kobayashi 2016), even if languages are typologically distant (Orcasitas-Vicandi 2018), such as the case of Basque, Spanish and English. These suggest connected systems (Cenoz & Gorter 2011) and parallel development of academic language (Granados et al. 2021), especially between their L1 and L2. In addition, certain dimensions of CAF have been shown to

be easily transferred across languages, such as accuracy and fluency. On the whole, this study has provided empirical evidence for Cummins' CUP and LIH theories.

Still, several limitations to this study need to be acknowledged. The sample suffered from high dropout rates due to COVID-19 (more than 30%), which complicated comparing the correlation coefficients between Basque- and Spanish-dominant learners. Future studies may consider different language profiles and proficiencies when exploring crosslinguistic transfers, with participants at different levels of proficiencies in the different languages. This could help determine if different language profiles, such as native-like trilinguals or heritage language speakers, influence the type of crosslinguistic transfers that occur in multilingual writing. In addition, CAF measures might not be able to fully capture the subject-specific nature of the prompt, which would shed light on the crosslinguistic transfer of disciplinary measures. This could be overcome with corpus linguistic approaches focusing on subject-specific vocabulary, for example. As previously mentioned, MultiAzterTest presents some limitations when analysing lexical complexity, specially in the case of Basque, due to its agglutinative morphology. These limitations could be overcome by using other specific corpus tools for the Basque language (see for example ANALHITZA, Otegi et al., 2017). This tool provides information about lexical features of a text in Basque, Spanish and English. The combination of multiple corpus tools should be addressed in future studies to consider their consistency. Further research should consider creating subject-specific measures along CAF to explore disciplinary writing, as well as a method that might serve to compare word-related fluency measures across languages with different typologies-e.g., Basque vs Spanish (Mylläri 2020). Furthermore, other linguistic measures in addition to CAF should also be considered, such as functional adequacy (see Kuiken & Vedder, 2022), since these might facilitate understanding how subject-specific writing works. Future research could include qualitative research methods, such as interviews or think-aloud protocols, during the writing process, as these could provide interesting insights about how multilingual texts are constructed.

Our study yields several pedagogical implications that could help inform policy-makers, educators and teacher trainers. Multilingual contexts need for multilingual approaches (Cenoz & Gorter 2011) which foster transfer across languages and focus on the development of students' academic language skills (Cummins 1980). This study calls for an integrated language teaching curricula (Apraiza Jaio et al. 2012) in which crosslinguistic patterns are explicitly taught to students in all the languages of schooling. This approach could highly benefit language learning in immersion settings, especially in minority language contexts, such as the Basque Country, and provide students with opportunities to develop their multilingual awareness.

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References

- Apraiz Jairo, María Victoria, Marimar Pérez Gómez & Teresa Ruiz Pérez. 2012. La enseñanza integrada de las lenguas en la escuela plurilingüe. *Revista Iberoamericana de Educación* 59(1), 119–137.
- Bengoetxea, Kepa, Itziar Gonzalez-Dios & Amaia Aguirregoitia. 2020. AzterTest: Open Source Linguistic and Stylistic Analysis Tool. *Procesamiento Del Lenguaje Natural* 64, 61–68. <https://doi.org/10.26342/2020-64-7>
- Bui, Gavin & Peter Skehan. 2018. Complexity, Accuracy, and Fluency. *The TESOL Encyclopedia of English Language Teaching*, 1–7. <https://doi.org/10.1002/9781118784235.eelt0046>
- Bulté, Bram, & Alex Housen. 2012. Defining and operationalising L2 complexity. In Alex Housen, Folkert Kuiken & Ineke Vedder (Eds.), *Dimensions of L2 Performance and Proficiency. Complexity, Accuracy and Fluency in SLA*. (pp. 50–68). John Benjamins Publishing Company.
- Cenoz, Jasone & Durk Gorter. 2011. Focus on Multilingualism: A Study of Trilingual Writing. *The Modern Language Journal* 95(3), 356–369.
- Cenoz, Jasone. 2013. The influence of bilingualism on third language acquisition: Focus on multilingualism. *Language Teaching* 46(1), 71–86. <https://doi.org/10.1017/S0261444811000218>
- Cenoz, Jasone. 2023. Plurilingual education in the Basque Autonomous Community. In Josep Maria Cots (Ed.), *Profiling plurilingual education: A pilot study of four Spanish autonomous communities* (pp. 33–53). Edicions de la Universitat de Lleida.
- Chau, Luan Tuyen, Mariëlle Leijten, Sarah Bernolet & Lieve Vangehuchten. 2022. Envisioning multilingualism in source-based writing in L1, L2, and L3: The relation between source use and text quality. *Frontiers in Psychology* 13, 01–20. <https://doi.org/10.3389/fpsyg.2022.914125>
- Christie, Frances. 2012. *Language education throughout the school years: a functional perspective*. Wiley-Blackwell.
- Cook, Vivian. 1992. Evidence for multicompetence. *Language Learning* 42, 557–591.
- Crossley, Scott. A. & Minkyung Kim. 2022. Linguistic Features of Writing Quality and Development: A Longitudinal Approach. *Journal of Writing Analytics* 6, 59–93. <https://doi.org/10.37514/JWA-J.2022.6.1.04>
- Crossley, Scott. A. & Danielle S. McNamara. 2014. Does writing development equal writing quality? A computational investigation of syntactic complexity in L2 learners. *Journal of Second Language Writing* 26, 66–79. <https://doi.org/10.1016/j.jslw.2014.09.006>
- Cummins, Jim. 1979. Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research* 49, 221–251. <https://doi.org/10.3102/00346543049002222>
- Cummins, Jim. 1980. The exit and entry fallacy in bilingual education. *NABE Journal* 4(3), 25–60. <https://doi.org/10.1080/08855072.1980.10668382>
- Cummins, Jim. 2021. *Rethinking the Education of Multilingual Learners: A Critical Analysis of Theoretical Concepts*. Multilingual Matters. <https://doi.org/10.21832/9781800413597>
- de Bruin, Angela, Manuel Carreiras & Jon Andoni Duñabeitia. 2017. The BEST Dataset of Language Proficiency. *Frontiers in Psychology* 8, 1–7. <https://doi.org/10.3389/fpsyg.2017.00522>

- Egli Cuenat, Mirjam. 2017. Dreisprachige Textproduktion bei Sekundarschülerinnen und -schülern mit unterschiedlichen Lernbedingungen. *Zeitschrift für Interkulturellen Fremdsprachenunterricht: Didaktik und Methodik im Bereich Deutsch als Fremdsprache* 22(1).
- Egli Cuenat, Mirjam. 2022. Development of writing abilities across languages and school-levels: Room descriptions produced in three languages at primary and secondary school. *European Journal of Applied Linguistics* 11(1), 132–159. <https://doi.org/10.1515/eujal-2021-0010>
- Etzague Goia, Itxaro & Karin van der Worp. 2020. Hizkuntzen arteko elkarreragina: euskara, gaztelania eta ingelesezko ekoizpen idatziak. [Translated title: Cross-linguistic influence: written productions in Basque, Spanish and English]. *Tantak* 32(2), 95–126. <https://doi.org/10.1387/tantak.21826>
- Evnitskaya, Natalia & Christiane Dalton-Puffer. 2023 Cognitive discourse functions in CLIL classrooms: eliciting and analysing students' oral categorizations in science and history. *International Journal of Bilingual Education and Bilingualism* 26(3), 311–330. <https://doi.org/10.1080/13670050.2020.1804824>
- Forbes, Karen. 2020. *Cross-linguistic transfer of writing strategies: Interactions between foreign language and first language classrooms*. Multilingual Matters.
- Forbes, Karen & Linda Fisher (2018). Strategy development and cross-linguistic transfer in foreign and first language writing. *Applied Linguistics Review* 11(2), 311–339. <https://doi.org/10.1515/applirev-2018-0008>
- Gogolin, Ingrid. 2018. Literacy and Language Diversity: Challenges for Education Research and Practice in the 21st Century. In Lori Diane Hill & Felice J. Levine (Eds.), *Global Perspectives on Education Research* (pp. 3–26). Routledge.
- Granados, Adrián, Antonio Lorenzo-Espejo & Francisco Lorenzo. 2021. Evidence for the interdependence hypothesis: a longitudinal study of biliteracy development in a CLIL/bilingual setting. *International Journal of Bilingual Education and Bilingualism* 25(8), 3005–3021.
- Granados, Adrián, Antonio Lorenzo-Espejo & Francisco Lorenzo. 2022. A portrait of academic literacy in mid-adolescence: a computational longitudinal account of cognitive academic language proficiency during secondary school. *Language and Education*, <https://doi.org/10.1080/09500782.2022.2079951>
- Goikoetxea, Nekane. 2008. Hizkuntzen arteko elkar eragina EAeko hezkuntza eleanitzean. [Translated title: Language interaction in the multilingual education of the BAC]. *Bat Soziolinguistika Aldizkaria* 68, 149–164.
- Housen, Alex & Folkert Kuiken. 2009. Complexity, Accuracy, and Fluency in Second Language Acquisition. *Applied Linguistics* 30(4), 461–473. <https://doi.org/10.1093/applin/amp048>
- Imaz Agirre, Ainara, Roberto Arias-Hermoso & Nagore Ipiña. (under review). The effect on an intervention focused on academic language on secondary students' multilingual writing of CAF measures.
- Izura, Cristina, Fernando Cueto & Marc Brysbaert. 2014. Lextale-Esp: a test to rapidly and efficiently assess the Spanish vocabulary size. *Psicológica* 35, 49–66.
- Lahuerta, Ana. 2020. Analysis of accuracy in the writing of EFL students enrolled on CLIL and non-CLIL programmes: the impact of grade and gender. *The Language Learning Journal* 48(2), 121–132. <https://doi.org/10.1080/09571736.2017.1303745>
- Lemhöfer, Kristin & Mirjam Broersma. 2012. Introducing LexTALE: A quick and valid Lexical Test for Advanced Learners of English. *Behaviour Research Methods* 44, 325–343 <https://doi.org/10.3758/s13428-011-0146-0>
- Llinares, Ana & Nashwa Nashaat-Sobhy. 2021. What is an ecosystem? Defining science in primary school CLIL contexts. *Language Teaching for Young Learners* 3(2), 337–362. <https://doi.org/10.1075/ityl.20010.lil>
- Lorenzo, Francisco, Adrián Granados & Inmaculada Ávila. 2019. The Development of Cognitive Academic Language Proficiency in Multilingual Education: Evidence of a Longitudinal Study on the Language

- of History. *Journal of English for Academic Purposes* 41: 100767. <https://doi.org/10.1016/j.jjeap.2019.06.010>
- Lu, Xiaofei. 2017. Automated measurement of syntactic complexity in corpus-based L2 writing research and implications for writing assessment. *Language Testing* 34(4), 493–511. <https://doi.org/10.1177/0265532217710675>
- Maamuujav, Undarmaa. 2021. Examining lexical features and academic vocabulary use in adolescent L2 students' text-based analytical essays. *Assessing Writing* 49, 100540. <https://doi.org/10.1016/j.asw.2021.100540>
- Manchón, Rosa M. & Charlene Polio. 2021. L2 Writing and Language Learning. In Rosa M. Manchón & Charlene Polio (Eds.), *The Routledge Handbook in Second Language Acquisition: Second Language Acquisition and Writing* (pp. 1–7). Routledge.
- Martín-Laguna, Sofía & Eva Alcón-Soler. 2018. Development of discourse-pragmatic markers in a multilingual classroom: A mixed method research approach. *System* 75, 68–80. <https://doi.org/10.1016/j.system.2018.03.009>
- Martín-Laguna, Sofía. 2022. The multilingual turn in pragmatics: Is the use of hedges and attitude markers shared across languages in trilingual writing?. *Applied Pragmatics* 4(1), 63–91. <https://doi.org/10.1075/ap.20024.mar>
- Michel, Marije. 2017. Complexity, Accuracy and Fluency in L2 Production. In Shawn Loewen & Masatoshi Sato (Eds.), *The Routledge Handbook of Instructed Second Language Acquisition* (pp. 50–68). Routledge.
- Muñoz, Carmen & Elsa Tragant. 2023. Written and Oral Production Development through Primary and Secondary School. In Elsa Tragant & Carmen Muñoz (Eds.), *Ten Years of English Learning at School* (pp. 69–109). Springer.
- Mylläri, Taina. 2020. Words, clauses, sentences, and T-units in learner language: Precise and objective units of measure?. *Journal of the European Second Language Association* 4(1), 13–23. <https://doi.org/10.22599/jesla.63>
- Orcasitas-Vicandi, María. 2018. *Writing in Three Languages: Analytic, Holistic and Crosslinguistic Perspectives*. [Doctoral dissertation]. UPV/EHU.
- Orcasitas-Vicandi, María. 2021. Towards a multilingual approach in assessing writing: holistic, analytic and cross-linguistic perspectives. *International Journal of Bilingual Education and Bilingualism* 25(6), 1–22. <https://doi.org/10.1080/13670050.2021.1894089>
- Otegi, Arantxa, Oier Imaz, Arantza Díaz de Ilarraza, Mikel Iruskieta & Larraitz Uria. 2017. ANALHITZA: a tool to extract linguistic information from large corpora in Humanities research. *Procesamiento del Lenguaje Natural* 58, 77–84.
- Pagola, Iker. 2010. Hiru hizkuntzen arteko elkarreragina: bigarren hizkuntzatik ama hizkuntzara. [Translated title: Interaction in three languages: from a second language to the mother tongue]. *Ikastaria* 17, 121–154.
- Pérez-Vidal, Carmen & David Lasagabaster. 2021. Writing in CLIL. In Rosa M. Manchón & Charlene Polio (Eds.) *The Routledge Handbook of Writing*. Routledge.
- Phuoc, Vo Dihn & Jessie S. Barrot. 2022. Complexity, accuracy, and fluency in L2 writing across proficiency levels: A matter of L1 background? *Assessing Writing* 54, 100673. <https://doi.org/10.1016/j.asw.2022.100673>
- Rinnert, Carol & Hiroe Kobayashi. 2016. Multicompetence and multilingual writing. In Rosa M. Manchón & Paul Matsuda (Eds.), *Handbook of Second and Foreign Language Writing* (pp. 365–386). De Gruyter Mouton. <https://doi.org/10.1515/9781614511335-020>
- Sagasta, María Pilar (2003). Acquiring writing skills in a third language: The positive effects of bilingualism. *International Journal of Bilingualism* 7(1), 27–42. <https://doi.org/10.1177/13670069030070010301>

- San Isidro, Xabier & David Lasagabaster. 2018. The impact of CLIL on pluriliteracy development and content learning in a rural multilingual setting: A longitudinal study. *Language Teaching Research* 23 (5), 1–19. <https://doi.org/10.1177/1362168817754103>
- Schnoor, Birger & Irina Usanova. 2023. Multilingual writing development: Relationships between writing proficiencies in German, heritage language and English. *Reading and Writing* 36, 599–623. <https://doi.org/10.1007/s11145-022-10276-4>
- The jamovi project. 2022. jamovi (Version 2.3) [Computer Software]. Retrieved from <https://www.jamovi.org>
- Wolfe-Quintero, Kate, Shunji Inagaki & Hae-Young Kim. 1998. *Second Language Development in Writing: Measures of Fluency, Accuracy, and Complexity*. University of Hawaii Press.
- Yang, Wenxing & Ying Su. 2015. Dynamic Development of Complexity, Accuracy and Fluency in Multilingual Learners' L1, L2 and L3 Writing. *Theory and Practice in Language Studies* 5(2), 298–308. <http://dx.doi.org/10.17507/tpls.0502.09>