

# LEXICAL AVAILABILITY IN MULTILINGUAL CLIL: GENDER-DEPENDENT DIFFERENCES IN ENGLISH AND FRENCH

## DISPONIBILIDAD LÉXICA EN AICLE MULTILINGÜE: DIFERENCIAS DEPENDIENTES DEL GÉNERO EN INGLÉS Y FRANCÉS

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### Abstract

It has been suggested that Content and Language Integrated Learning (CLIL) positively affects learners' content-related vocabulary. While CLIL has become increasingly popular throughout Spain, the language of instruction in this learning environment has predominantly been English, largely to the neglect of other languages. Calls have consequently been made to conduct comparative research across other languages to better understand the strengths and weaknesses of CLIL irrespective of the language of instruction. In addition, female learners have been found to outperform males in areas of vocabulary such as lexical availability (LA) in English. However, given suggestions that CLIL may blur gender differences, it is unclear whether this difference is also found in a multilingual CLIL context. This study thus aims to determine whether an English advantage is observed in LA in a multilingual CLIL environment, and whether this advantage varies in male and female learners. Results indicate that there is a clear dominance in English over French, regardless of gender. However, analysis across different grades reveals that CLIL instruction has a clear effect on the students' LA in different languages, but in different ways for male and female learners. The findings are of key importance to CLIL stakeholders wishing to support male and female learners in multilingual classrooms.

**Keywords:** content and language integrated learning, gender, lexical availability, English as a foreign language, French as a foreign language.

## Resumen

Se ha indicado que el Aprendizaje Integrado de Contenidos y Lenguas Extranjeras (AICLE) tiene efectos positivos en el aprendizaje del vocabulario relacionado con el contenido. No obstante, aunque el AICLE haya crecido a gran escala por toda España, la gran mayoría de los programas se imparten en inglés y se han desatendido en gran medida los idiomas distintos del inglés. Por eso, se ha hecho un llamamiento a la investigación comparativa de diferentes lenguas meta, con el fin de comprender las fortalezas y debilidades de AICLE independientemente de la lengua del programa. Además, la investigación sobre género y disponibilidad léxica ha comprobado que las alumnas suelen obtener mejores promedios de respuestas que los alumnos. Sin embargo, dado que se ha sugerido que un contexto AICLE tiene la capacidad de desdibujar las diferencias de género, se necesita más investigación para entender si la instrucción AICLE afecta a esta ventaja, o si los alumnos y las alumnas obtienen promedios parecidos. Por consiguiente, este estudio pretende analizar la disponibilidad léxica en un contexto AICLE para determinar si existe una ventaja en inglés y si esta ventaja depende del género. Los resultados indican diferencias claras entre la disponibilidad en inglés y francés, con ventaja del inglés, independientemente del género. No obstante, un análisis transversal indica que la instrucción AICLE tiene un fuerte impacto en la disponibilidad léxica en cada idioma, pero de manera distinta para las chicas y los chicos. Los hallazgos son de suma importancia para quienes quieran apoyar a las alumnas y los alumnos en un aula multilingüe.

**Palabras clave:** aprendizaje integrado de contenidos y lenguas extranjeras, género, disponibilidad léxica, inglés como lengua extranjera, francés como lengua extranjera.

## 1. Introduction

The rise of English as a global language has had a remarkable impact on the field of language learning. Not only has its importance led to a notable increase in the number of learners studying the language, but it has also vastly overshadowed the study of languages other than English (LOTEs) (Dörnyei and Al-Hoorie 2017). One teaching context where this is particularly evident is that of Content and Language Integrated Learning (CLIL). While CLIL approaches were originally introduced into European classrooms with the aim of promoting multilingualism, English has clearly dominated as the language of instruction (San Isidro 2018). This is so much the case that some definitions of CLIL neglect entirely the possibility that LOTEs may be used. For example, Lyster and Ballinger (2011)

suggest that one of the key differences between immersion and CLIL is that, although both integrate content and language instruction, immersion does so in languages other than only English. Graddol also neglects the possibility of LOTEs in CLIL, noting that “CLIL is an approach to bilingual education in which both curriculum content —such as Science or Geography— and *English* are taught together” (2006: 86, emphasis added). Given this prevalence of English, Dalton-Puffer (2011) has even suggested that it would perhaps make more sense to refer to the approach as CEIL, that is, Content and English Integrated Learning.

Within a multilingual context whereby CLIL instruction is delivered in English as well as another target language (TL), there are two factors which are of central interest. Firstly, it has been suggested that vocabulary is crucial in a CLIL context, particularly in terms of content-related vocabulary (Heras and Lasagabaster 2015). However, in some areas of vocabulary research, such as lexical availability (LA), there have been calls to provide evidence of the relationship between the vocabulary to which students are exposed and the vocabulary they are able to produce, for example, by measuring production in LA prompts which are actually linked to the content subject (Canga Alonso 2017). Secondly, regarding gender, female students have often been found to outperform male students in terms of vocabulary, potentially due to higher language learning motivation (Agustín Llach and Fernández Fontecha 2014). However, recent research indicates that this advantage may depend on the teaching context at hand (Gallardo-del-Puerto and Blanco-Suárez 2021). In addition, this research has largely focused on English as a Foreign Language (EFL), with a clear lack of studies on LOTEs.

The present study intends to address these two issues in a multilingual CLIL context. Firstly, it aims to investigate learners’ LA in English and French using content-related prompts, to determine whether there is indeed an English advantage over French. Secondly, it seeks to determine whether this advantage varies in male and female learners in each TL.

## 2. Theoretical Background

### 2.1. Lexical Availability in Multiple Target Languages

LA is generally assessed by means of the lexical availability task (LAT), a paper-and-pencil questionnaire in which participants are given a prompt and asked to write down any words which come to mind in two minutes (e.g. animals: dog, cat, bird, etc.). One of the clear advantages of this task is that it provides an extremely valuable indication of learners’ lexical resources and, additionally, allows researchers

to obtain this data in a straightforward, economical way (Jiménez Catalán and Fitzpatrick 2014). Nevertheless, while LA is well understood to be an integral part of lexical and communicative competence, there has been a clear scarcity of LA research in foreign language learning and even less in vocabulary studies (Jiménez Catalán 2014a). This is particularly so in terms of EFL, not to mention LOTEs, as LA research thus far has largely focused on L2 Spanish (Martínez-Adrián and Gallardo-del-Puerto 2017).

Over the last decade, however, LA research addressing EFL alongside LOTEs has begun to take form. For example, Šifrar Kalan (2014) investigated the LA of university students of English ( $n = 20$ ) or Spanish ( $n = 20$ ) in a Slovenian context. Results indicated that, although there were similarities in the productivity of different prompts, slightly higher means were found among those studying English. In a Spanish context, Santos Díaz (2017) also addressed the LA of university students, measuring production in both the participants' mother tongue, Spanish, and a TL, either English ( $n = 150$ ) or French ( $n = 21$ ). While results understandably indicated that the highest means were observed in participants' mother tongue, they also revealed that those in the EFL group obtained a higher mean (261.67) than those in the French as a Foreign Language (FFL) group (221.23). Finally, Sandu and Konstantinidi (2021) assessed LA in different learners who had visited a TL country, but who came from two distinct contexts, namely, upper-secondary school students of Spanish in Romania and university students of English in Spain. Although each group had comparable language levels, it was found that the EFL students again produced a higher number of tokens than those studying Spanish. While this research by and large suggests that there is an English advantage in terms of LA, it should be noted that these studies have compared different groups of students, rather than assessing the same cohort of students simultaneously studying English alongside a LOTE. They have also largely focused on university students, with a scarcity of research on secondary education. In addition, research has yet to address this issue in a multilingual CLIL context in which the same participants take content classes in more than one TL. It is thus necessary to specifically address these gaps by carrying out research which compares the LA of the same cohort of secondary CLIL school students in two TLs: English and a LOTE.

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## 2.2. Lexical Availability and Gender

In addition to the English advantage discussed above, another key factor which is thought to influence LA is that of gender. Within a Spanish context, research on gender and LA has primarily been carried out on EFL learners, with an evident dearth of research on FFL.

In terms of young learners, Jiménez Catalán and Ojeda Alba (2009) compared the English LA of 105 males and 105 females in 6<sup>th</sup> grade of primary school. Findings showed that female students produced a statistically significant higher number of tokens than male students across all fifteen prompts under analysis. Agustín Llach and Fernández Fontecha (2014) also assessed 6<sup>th</sup> grade learners (106 male and 84 female), and additionally adopted a longitudinal approach by assessing the same participants three years later in 9<sup>th</sup> grade of secondary school. Across the nine prompts under analysis, female participants again produced a statistically significant higher number of words in English than their male peers at both levels. However, the significance values decreased at the second data collection, suggesting that differences in gender in LA might also be related to age. Adolescent learners in 8<sup>th</sup> grade were assessed by Fernández Fontecha (2010), who compared the English LA of 139 male and 111 female students. Findings showed that, again, female students produced a statistically significant higher number of tokens than the male students. Although the above studies show a clear advantage for female students, very different results have been reported by Jiménez Catalán and Canga Alonso (2019) in terms of older high school students. This study, which compared 94 male and 171 female learners in 12<sup>th</sup> grade, found no statistically significant difference between male and female learners' LA. Thus, contrary to results from younger Spanish EFL students, there appears to be no female advantage in LA in English by the end of high school.

While the above research suggests that Spanish female students generally outperform their male peers in terms of LA in English, there are two important observations which must be considered. Firstly, this advantage has been found in primary and early secondary school students up to 9<sup>th</sup> grade, whereas no differences have been found in 12<sup>th</sup> grade high school students (Jiménez Catalán and Canga Alonso 2019). This, alongside the longitudinal findings of Agustín Llach and Fernández Fontecha (2014) above, suggests that the gender differences in earlier grades may dissipate as learners age. However, given the lack of research on students in upper secondary education, it is unclear whether this is indeed the case. LA research is needed in cohorts of students between 9<sup>th</sup> and 12<sup>th</sup> grade in order to determine whether there is an age-related effect. Secondly, recent research suggests that female advantages in language learning may be context dependent. For example, findings by Gallardo-del-Puerto and Blanco-Suárez (2021) have indicated that while a female advantage in motivation was found in non-CLIL students, the same was not true for CLIL students. It thus remains to be seen whether female advantages in LA are also observed in contexts where students received not only typical FL classes, but also CLIL instruction. In this vein, there is a clear need to carry out further LA research on different TLs to ascertain

whether this female advantage remains in later school years, particularly 9<sup>th</sup> and 10<sup>th</sup> grade, and whether CLIL instruction plays a part.

### 3. Methodology

#### 3.1. Study Design

This study aimed to determine whether there were quantitative differences between male and female learners' lexical availability in English and French in an upper secondary CLIL context. In particular, it sought to address two issues: firstly, whether an English advantage in LA would be observed when assessing a cohort of students simultaneously studying two TLs in both male and female learners; and secondly, whether these differences would be observed from one grade to the next. To this effect, the following research questions were proposed:

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1. Are there quantitative differences in the English and French lexical availability of Spanish male and female upper secondary school CLIL students?
2. Are there quantitative differences in the English and French lexical availability of Spanish male and female upper secondary school CLIL students when measured cross-sectionally over two grades?

In order to address these research questions, data were collected from four cohorts of students: male students and female students in 9<sup>th</sup> grade and male students and female students in 10<sup>th</sup> grade. Prior to data collection, the directors of both participating schools as well as each participating student signed consent forms which detailed the purpose of the study, the data collection, confidentiality, and results of the study. Participants then completed a LAT in both of their TLs, English and French. This approach entailed that male and females' LA in both TLs could be compared in each grade under analysis, as well as cross-sectionally from 9<sup>th</sup> to 10<sup>th</sup> grade.

#### 3.2. Participants

This study was carried out with a total of 83 Spanish native speakers from 9<sup>th</sup> and 10<sup>th</sup> grade. All participants attended one of two semi-private sister schools, one for males and one for females, which conduct both content and language classes in Spanish, English, and French. This plurilingual approach is offered to students throughout early childhood education, primary education, and obligatory secondary education, so that students receive classes in each of these three languages from the age of 3 until approximately the age of 16. In some cases, content classes in a TL also continue into high school. Each language is used as a

vehicular language and should take up a third of the students' school day. In terms of language level, students are expected to have obtained a B2 or C1 level in each of their TLs before they finish school. In addition, students have the opportunity to study a fourth language, such as Latin or Greek.

For the purposes of this study, students were grouped according to both grade and gender, as outlined in Table 1:

	Male	Female	Total
9 <sup>th</sup> grade	19 (16 only for English)	23	42
10 <sup>th</sup> grade	15	26	41

Table 1. Participants

A total of 42 and 41 students took part in the study in 9<sup>th</sup> and 10<sup>th</sup> grade, respectively. However, there were some male students from 9<sup>th</sup> grade who took part in the tests for only French. This was due to the fact that, following the French tests, three students later opted not to take part in the English tests.

In terms of the participants' CLIL classes, it should be noted that while the schools' plurilingual approach supposedly entails that one third of the students' day is allotted to each language of instruction, in reality these students appear to receive a great deal more exposure to English than French, particularly in certain grades. For example, in 9<sup>th</sup> grade, participants studied four content classes in English as compared to just one in French. In some cases, the classes taken in a TL varied from year to year, with subjects such as Technology being studied in English in 9<sup>th</sup> grade but not in 10<sup>th</sup> grade. Other classes, such as Physical Education in English and Geography and History in French, were taken throughout secondary education. In addition, there were some differences depending on the school, meaning that in some cases males and females took different classes (Table 2).

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	English	French
9 <sup>th</sup> Grade	Physics and Chemistry Biology Physical Education Technology	Geography and History
10 <sup>th</sup> Grade	Science* ( <i>n</i> = 26) or Economics ( <i>n</i> = 15) Physical Education	Geography and History

Note. \* Males studied Physics and Chemistry (*n* = 10); females studied Biology (*n* = 16)

Table 2. CLIL subjects taken by participants

Throughout obligatory secondary education, including 9<sup>th</sup> and 10<sup>th</sup> grade, all students studied Physical Education through English and Geography and History through French. In 9<sup>th</sup> grade, participants additionally studied Technology and two science subjects (Physics and Chemistry, and Biology) in English. In 10<sup>th</sup> grade, however, students choose between continuing with one of these science subjects or beginning to study Economics. The science subject available was dependent on school and consequently gender; boys could study Physics and Chemistry while girls could study Biology.

### 3.3. Instruments

In order to assess the participants' LA, two LATs were administered: one in French and one in English. The tests were administered during the students' English and French language classes, with each group taking the two tests on the same school day. The tasks were paper-and-pencil questionnaires, in which participants were given prompts and told to write down any words which came to them in a period of two minutes. Each prompt was displayed on a separate page with numbered lines and participants could not move on to the next prompt until told to do so by the researcher. Five prompts were included in this study, which were the same in both TLs:

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- (1) Animals
- (2) Food and drink
- (3) Sport and physical activities
- (4) Environment and climate
- (5) Economy and money

The prompts chosen included two general prompts, *Animals* and *Food and drink*, and three prompts which aimed to tap into participants' content-related vocabulary: *Sport and physical activities* (Physical Education studied through English), *Environment and climate* (Geography and History, studied through French), and *Economy and Money* (Economics, studied through English). The general prompts were adopted from previous research in the field which has analyzed the LA of Spanish adolescents (Fernández Orío and Jiménez Catalán 2015; Canga Alonso 2017). These prompts have been found to be particularly productive, likely given the fact that they include vocabulary to which students typically receive a high level of exposure (Fernández Orío and Jiménez Catalán 2015). While the remaining prompts catered specifically to the participants in this study, comparable semantic domains had been addressed in previous research, namely *Sports and hobbies*, which



was included in Agustín Llach and Fontecha (2014) and *The Environment and The Economy*, which were included by Neilson Parada (2016).

### 3.4. Data Analysis

Prior to analysis, participants' responses were lemmatized following criteria applied by Jiménez Catalán and Agustín Llach (2017). This included correcting spelling mistakes; removing unintelligible words or words which were not in the TL; counting repeated words only once; removing proper nouns; and changing plural words into the singular form, except in cases where the word is always plural.

Data analysis was carried out using SPSS (Version 26). Prior to conducting the analysis, the normality of the overall LA tasks and that of each prompt was assessed for each group of students. The data were found to be normally distributed, except in the following three cases: *Animals* in English and *Sport and physical activities* in French for 9<sup>th</sup> grade males; and *Animals* in French for 9<sup>th</sup> grade females. The results of the normality tests were used to determine which test was run when analyzing the quantitative differences in the English and French LA of male and female participants: paired samples t-tests were used when the data were normally distributed, while the non-parametric alternative, Wilcoxon signed-rank tests, were used when the data were non-normally distributed (Dörnyei 2007). Participants' LA was compared in terms of the mean tokens produced across all five prompts as well as the total tokens produced in each of the five prompts. Analyses were first run on the male participants in each grade, comparing their responses in English with those in French. This was followed by an analysis of female participants' responses in English and French. Results of the two sets of analyses were then compared, in order to determine whether there were differences between genders in English and French LA. For the cross-sectional analysis, two-way mixed ANOVAS were carried out in order to compare participants in 9<sup>th</sup> and 10<sup>th</sup> grade. This included one within-subjects factor (language) and one between-subjects factor (grade). The analysis was again run first for male students and then for female students, and then the results of the two analyses were compared.

## 4. Results

### 4.1. Male and Female Participants' Lexical Availability in English and French

Research question 1 addressed whether there were quantitative differences in the words retrieved by male participants and female participants in English as compared

to French in each grade. Token production in each language was thus compared, first for male learners and then for female learners. The results of each were then analyzed in order to determine whether any advantages observed were gender-dependent or varied in male and female learners.

4.1.1. Male Participants' Lexical Availability in English and French

In order to compare the overall number of tokens and the total number of tokens produced for each individual prompt by male participants in English and French, paired samples t-tests (Wilcoxon signed-rank tests in the case of the prompts *Animals* and *Sport and Physical Activities* for 9<sup>th</sup> grade students) were run (Table 3).

9 <sup>th</sup> grade							
Prompt	M		SD		t / z	df	p
	English	French	English	French			
1) Animals*	16.94	7.47	8.31	3.53	-3.07		.002
2) Food and drink	13.88	6.63	8.17	3.72	3.65	15	.002
3) Sport and physical activities*	14.06	6.95	7.10	3.70	-3.31		.001
4) Environment and climate	14.19	7.88	8.47	5.35	3.25	15	.005
5) Economy and money	7.69	4.88	6.61	3.24	2.05	15	.058
Mean Lexical Availability	13.35	6.72	6.90	3.00	4.27	15	.001

10 <sup>th</sup> grade							
Prompt	M		SD		t	df	p
	English	French	English	French			
1) Animals	17.73	8.40	4.496	2.77	10.45	14	< .001
2) Food and drink	19.87	8.07	4.734	4.31	10.36	14	< .001
3) Sport and physical activities	14.93	11.47	2.764	2.03	4.19	14	.001
4) Environment and climate	15.27	7.60	6.19	3.66	6.46	14	< .001
5) Economy and money	11.60	10.67	4.71	3.71	.788	14	.444

Mean Lexical Availability	15.88	9.24	3.41	2.58	11.80	14	< .001
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Note. \* = non-parametric test used, as data were not normally distributed.

Table 3. Male students' lexical availability in English and French

As shown, results indicate that male participants in each grade retrieved a statistically significant higher number of words in English than in French overall. In terms of the individual prompts, male students generally produced a statistically significant higher number of tokens in English; however, this was not the case for the prompt *Economy and money* in either grade, where no statistically significant differences were observed. It should be recalled that this prompt was included to tap into participants' content-related vocabulary from their Economics class, which was taken as an elective subject by some students in 10<sup>th</sup> grade. Notably, 9<sup>th</sup> grade students did not take this subject, and 10<sup>th</sup> grade students had been studying the subject through English for just four months at the time of the data collection. It appears that this short period of time may not be enough to make a difference between the students' English and French LA in this prompt.

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#### 4.1.2. Female Participants' Lexical Availability in English and French

In order to compare the overall number of tokens and the total number of tokens produced for each individual prompt by female participants in English and French, paired samples t-tests (Wilcoxon signed-rank tests in the case of the prompt *Animals* for 9<sup>th</sup> grade students) were run (Table 4).

Prompt	9 <sup>th</sup> grade				t / z	df	p
	M		SD				
	English	French	English	French			
1) Animals*	20.57	12.70	5.86	5.98	-3.79		< .001
2) Food and drink	24.05	12.23	6.40	4.73	8.10	21	< .001
3) Sport and physical activities*	15.14	11.68	5.12	2.93	3.43	21	.002
4) Environment and climate	19.48	11.83	6.29	4.68	6.34	22	< .001
5) Economy and money	12.35	10.26	4.83	4.57	2.93	22	.008
Mean Lexical Availability	18.25	11.72	4.96	3.33	8.94	22	< .001

Prompt	10 <sup>th</sup> grade				<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>		<i>SD</i>				
	English	French	English	French			
1) Animals	18.50	8.62	5.08	3.87	9.92	25	< .001
2) Food and drink	22.62	12.38	5.42	5.216	8.95	25	< .001
3) Sport and physical activities	17.58	11.08	5.13	2.85	6.98	25	< .001
4) Environment and climate	20.54	12.04	4.79	4.60	8.40	25	< .001
5) Economy and money	15.31	10.27	4.36	3.82	5.46	25	< .001
Mean Lexical Availability	18.90	10.87	3.96	3.19	11.47	25	< .001

Note. ' = non-parametric test used, as the data were not normally distributed.

Table 4. Female students' lexical availability in English and French

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Results reveal that female participants in each grade retrieved a statistically significant higher number of words in English than in French overall, which was also the case for male participants. In addition, female participants also produced a statistically significant higher number of tokens in English than in French in each of the five individual prompts.

#### 4.1.3. Gender-dependent Differences in English and French Lexical Availability

The results above indicate that, by and large, both male and female participants tend to produce a higher number of tokens in English than in French (Figure 1).

These results are consistent with the abovementioned research by Sandu and Konstantinidi (2021), Santos Díaz (2017) and Šifrar Kalan (2014), which found higher LA in students taking English as opposed to those taking a LOTE. In this study, similar results are observed when assessing the same cohort of students in both of their TLs, which is understandable given the focus on EFL in a Spanish context and the higher exposure that students generally receive as a result.

However, one key difference in gender was observed in the case of the content-relevant prompt *Economy and money*, where an advantage for English was found among female students but not for male students, both in 9<sup>th</sup> and 10<sup>th</sup> grade. This indicates that there is a greater difference between the economics-related vocabulary which female students have in each language than there is for male students. Given suggestions in previous research that CLIL can help to blur gender

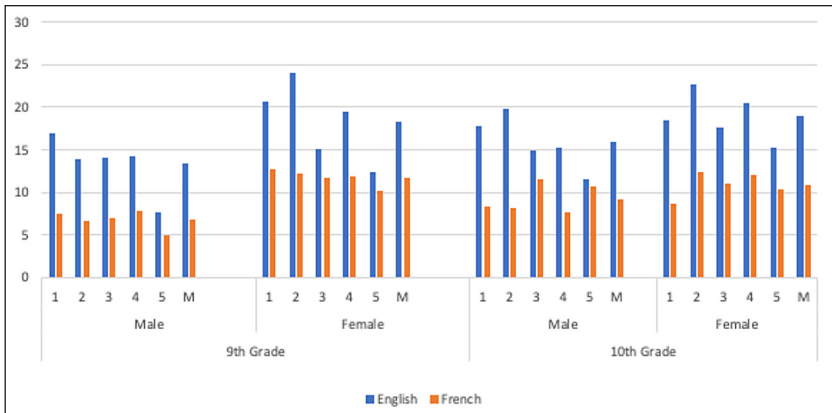


Figure 1. Differences in male and female participants' English and French LA

differences (Lasagabaster 2008), it would be expected that male learners taking content classes through the medium of a FL would perform in a similar way to their female peers. However, it is unlikely that exposure to content-related vocabulary has played a part in these results, as this difference was found both in 9<sup>th</sup> grade, where students do not take Economics through English, and in 10<sup>th</sup> grade, where a subgroup of students take Economics through English. Another explanation could be that these findings are due to the nature of the prompt at hand, as *Economy and money* is a relatively more open prompt as compared to prompts such as *Animals* and *Food and drink*, which are more closed. It may be the case that in this particular, potentially more challenging domain, male students have relied more on linguistic similarities between their two TLs; for example, using their knowledge of English to help them to produce tokens in the French test. This would have decreased the gap between the words produced in each TL, leading to the lack of differences observed in the male participants. Further research is evidently necessary to determine whether this is the case, and whether gender and the specific lexical domain have played a role in the results.

Despite the differences observed in this prompt, however, it appears that both male and female upper secondary school CLIL students generally have higher productive vocabulary in English than in French, regardless of gender.

## 4.2. Cross-sectional Differences in Male and Female Participants' Lexical Availability in English and French

The second research question addressed whether there were quantitative differences in the English and French LA of male and female upper secondary school CLIL students when measured cross-sectionally. For both male and female students, two-way mixed ANOVAS were used to analyze the LATs in English and French, to determine whether there was a main effect of grade (a difference between 9<sup>th</sup> grade and 10<sup>th</sup> grade students in both languages), a main effect of language (a difference between English and French in both grades), and an interaction between grade and language (a difference between 9<sup>th</sup> and 10<sup>th</sup> grade and English and French). This was done first for males and then females. The results of each were then compared to determine if there were gender-dependent variations.

### 4.2.1. Cross-sectional Differences in Male participants' Lexical Availability in English and French

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Firstly, for male students (Table 5), while means of the overall English and French tests were higher in 10<sup>th</sup> grade ( $M = 12.56$ ) than 9<sup>th</sup> grade ( $M = 10.03$ ), findings revealed no significant main effect of grade on the mean LATs ( $F(1, 29) = 3.64, p = .066, \eta_p^2 = .112$ ). That is to say, when taking into account both TLs, the number of words produced was relatively similar in each grade. However, there was a statistically significant main effect of language ( $F(1, 29) = 61.45, p < .001, \eta_p^2 = .679$ ), where overall means for the English task ( $M = 14.61$ ) were found to be a great deal higher than for the French task ( $M = 7.98$ ). In terms of the interaction between grade and language, no statistically significant interaction was observed ( $F(1, 29) = .000, p = .993, \eta_p^2 = .000$ ); in both languages, a higher number of tokens was produced by males in 10<sup>th</sup> grade (English:  $M = 15.88$ ; French:  $M = 15.88$ ) than males in 9<sup>th</sup> grade (English:  $M = 13.35$ ; French:  $M = 6.72$ ). This indicates that the number of tokens produced in each grade was not dependent on the language: 10<sup>th</sup> grade males generally produced more tokens regardless of the language at hand.

As regards the five individual prompts, findings showed that the means of both LATs were higher across all prompts for 10<sup>th</sup> grade students. However, there was a significant main effect of grade only in the case of the prompts *Food and drink* and *Economy and money*, with no significant main effect for the prompts *Animals*, *Sport and physical activity* and *Environment and climate*. In other words, when taking into account both languages, the older male students produced a notably higher number of words only in *Food and drink* and *Economy and money*. In all five prompts, there was a statistically significant main effect of language; as in the case

Grade						
	M		F	p	$\eta_p^2$	
	9 <sup>th</sup> Grade	10 <sup>th</sup> Grade				
1	11.96	13.06	.587	.450	.020	
2	10.25	13.96	5.27	.029	.154	
3	10.65	13.20	3.51	.071	.108	
4	11.03	11.43	.045	.834	.002	
5	6.28	11.13	11.18	.002	.278	
Mean	10.03	12.56	3.64	.066	.112	

Language						
	M		F	P	$\eta_p^2$	
	English	French				
1	17.33	7.70	59.45	< .001	.672	
2	16.87	7.34	67.03	< .001	.698	
3	14.49	9.35	35.71	< .001	.552	
4	14.72	7.73	36.59	< .001	.558	
5	9.64	7.77	4.22	.049	.127	
Mean	14.61	7.98	61.45	< .001	.679	

Grade*Language							
	M				F	p	$\eta_p^2$
	9 <sup>th</sup> Grade		10 <sup>th</sup> Grade				
	English	French	English	French			
1	16.93	7.00	17.73	8.40	.058	.811	.002
2	13.87	6.62	19.86	8.06	3.82	.060	.117
3	14.06	7.25	14.93	11.46	3.78	.061	.115
4	14.18	7.87	15.26	7.60	.343	.562	.012
5	7.68	4.87	11.60	10.66	1.06	.311	.035
Mean	13.35	6.72	15.88	9.24	.000	.993	.000

Note. Prompt 1 = *Animals*, Prompt 2 = *Food and drink*, Prompt 3 = *Sport and physical activity*, Prompt 4 = *Environment and climate*, Prompt 5 = *Economy and money*.

Table 5. Cross-sectional differences for male participants in English and French

of the overall task, means for English were much higher than for French. Finally, no statistically significant interaction was found between grade and language in any of the individual prompts. This suggests that the number of tokens produced in a particular grade does not depend on the language, as the older 10<sup>th</sup> grade students in general produced more tokens than the 9<sup>th</sup> grade students, regardless of the language at hand.

#### 4.2.2. Cross-sectional Differences in Female Participants' Lexical Availability in English and French

Secondly, for female students (Table 6), while means were slightly lower in 10<sup>th</sup> grade ( $M = 14.89$ ) than 9<sup>th</sup> grade ( $M = 14.99$ ), there was no significant main effect of grade on the mean LATs ( $F(1,47) = .010, p = .922, \eta_p^2 = .000$ ). This implies that when taking into account both TLs, female students in both grades performed similarly. However, as in the case of the male participants, there was a statistically significant main effect of language ( $F(1,47) = 206.68, p < .001, \eta_p^2 = .815$ ), where overall means for the English task ( $M = 18.58$ ) were found to be a great deal higher than the French task ( $M = 11.30$ ). In terms of the interaction between grade and language, no statistically significant interaction was observed ( $F(1,47) = 2.21, p = .144, \eta_p^2 = .045$ ), though there were some differences in each language. In English, a higher number of tokens was produced by females in 10<sup>th</sup> grade ( $M = 18.91$ ) than females in 9<sup>th</sup> grade ( $M = 18.25$ ). In French, on the other hand, fewer tokens were produced by females in 10<sup>th</sup> grade ( $M = 10.88$ ) than females in 9<sup>th</sup> grade ( $M = 11.73$ ).

As regards the five individual prompts, findings showed that there were some clear differences in terms of the general and content-relevant prompts: while means were higher in the general prompts *Animal* and *Food and drink* for 9<sup>th</sup> grade females, they were higher in the content-relevant prompts *Sport and physical activity*, *Environment and climate* and *Economy and money* for 10<sup>th</sup> grade females. Nonetheless, there was a significant main effect of grade only in the case of the prompt *Animals*, with higher means in both tasks in 9<sup>th</sup> grade, but no significant main effect for the prompts *Food and drink*, *Sport and physical activity*, *Environment and climate* and *Economy and money*. As was the case for male participants, in all five prompts, there was a statistically significant main effect of language; means for English were again much higher than for French. Finally, although no statistically significant interactions were observed between grade and language for male students in any of the individual prompts, this was not the case for female students. Interestingly, statistically significant interactions were found between grade and language specifically in the two prompts which were related to the students' English CLIL classes, namely, *Sport and physical activity* ( $F(1, 47) = 4.93$ ,



	Grade				
	<i>M</i>		<i>F</i>	<i>p</i>	$\eta_p^2$
	9 <sup>th</sup> Grade	10 <sup>th</sup> Grade			
1	16.63	13.56	5.64	.022	.107
2	18.14	17.50	.242	.625	.005
3	13.41	14.33	.855	.360	.018
4	15.65	16.29	.264	.610	.006
5	11.30	12.79	1.79	.187	.037
Mean	14.99	14.89	.010	.922	.000

	Language				
	<i>M</i>		<i>F</i>	<i>p</i>	$\eta_p^2$
	English	French			
1	19.53	10.66	138.73	< .001	.747
2	23.33	12.31	145.63	< .001	.760
3	16.36	11.38	52.74	< .001	.534
4	20.01	11.93	106.91	< .001	.695
5	13.83	10.27	36.00	< .001	.434
Mean	18.58	11.30	206.68	< .001	.815

	Grade*Language						
	<i>M</i>				<i>F</i>	<i>p</i>	$\eta_p^2$
	9 <sup>th</sup> Grade		10 <sup>th</sup> Grade				
	English	French	English	French			
1	20.57	12.70	18.50	8.62	1.78	.188	.037
2	24.05	12.23	22.62	12.39	.755	.389	.016
3	15.14	11.68	17.58	11.08	4.93	.031	.097
4	19.48	11.83	20.54	12.04	.295	.590	.006
5	12.35	10.26	15.31	10.27	6.17	.017	.116
Mean	18.25	11.73	18.91	10.88	2.21	.144	.045

Note. Prompt 1 = *Animals*, Prompt 2 = *Food and drink*, Prompt 3 = *Sport and physical activity*, Prompt 4 = *Environment and climate*, Prompt 5 = *Economy and money*.

Table 6. Cross-sectional differences for female participants in English and French

$p = .0312$ ,  $\eta_p^2 = .097$ ) and *Economy and money* ( $F(1, 47) = 6.17$ ,  $p = .017$ ,  $\eta_p^2 = .116$ ). Regarding the prompt *Sport and physical activity*, means in English were slightly higher in 10<sup>th</sup> grade ( $M = 17.58$ ) than 9<sup>th</sup> grade ( $M = 15.14$ ), whereas in French they were slightly lower in 10<sup>th</sup> grade ( $M = 11.08$ ) than in 9<sup>th</sup> grade ( $M = 11.68$ ). Regarding the prompt *Economy and Money*, means in English were slightly higher in 10<sup>th</sup> grade ( $M = 15.31$ ) than 9<sup>th</sup> grade ( $M = 12.35$ ), whereas in French they were very similar in both 10<sup>th</sup> grade ( $M = 10.27$ ) and 9<sup>th</sup> grade ( $M = 10.26$ ). This indicates that there is likely a clear influence of the increased exposure students receive to content-related vocabulary on their LA in English.

#### 4.2.3. Cross-sectional Gender-dependent Differences in English and French Lexical Availability

When turning to the cross-sectional analysis, there appear to be some noteworthy gender-based differences in terms of grade and the interaction between grade and language. These differences are summarized in Table 7 and discussed in turn below.

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	Grade		Language		Grade*Language	
	Male	Female	Male	Female	Male	Female
1		✓	✓	✓		
2	✓		✓	✓		
3			✓	✓		✓
4			✓	✓		
5	✓		✓	✓		✓
M			✓	✓		

Note. ✓ = statistically significant differences, 1 = *Animals*, 2 = *Food and drink*, 3 = *Sport and physical activity*, 4 = *Environment and climate*, 5 = *Economy and money*, M = Mean LAT.

Table 7. Summary of cross-sectional differences in English and French LATs by gender

Firstly, for male students, a significant main effect of grade was found for the prompts *Food and drink* and *Economy and money*. In both cases, the older, 10<sup>th</sup> grade students had higher means in their TLs. These findings make sense given the extra number of hours of exposure that the 10<sup>th</sup> grade students would have received. In addition, given that several 10<sup>th</sup> grade students studied Economics through English, whereas 9<sup>th</sup> grade students had not yet had the opportunity to take this subject, it is unsurprising that the 10<sup>th</sup> grade group would perform better in this prompt. The fact this was found for males, and not for females, may

be consistent with the suggestion that male students, who are often outperformed by their female peers in terms of language learning, may compensate for lower language learning motivation with higher motivation towards the content subject (Heras and Lasagabaster 2015). In other words, exposure to content-related vocabulary in their Economics class seems to make a greater difference among the male students when comparing those in 9<sup>th</sup> and 10<sup>th</sup> grade. On the other hand, for female students, a significant main effect of grade was found only for the prompt *Animals*, for which the younger 9<sup>th</sup> grade group had higher means. This result is unexpected, as it would be assumed that the older 10<sup>th</sup> grade students would produce more tokens across all five prompts, given the fact that they had spent one year more studying their TLs than their 9<sup>th</sup> grade peers. Given the nature of the approach used, it is possible that this finding may be explained by group differences; further longitudinal analysis would help to clarify whether this is the case.

In terms of the interaction between grade and language, there were again clear differences depending on gender. For males, no statistically significant interaction was found in any of the five individual prompts or in the overall task. On the other hand, for females, a statistically significant interaction was found in the two prompts which were related to content taught through English, namely *Sport and physical activity* and *Economy and money*. For both prompts, 10<sup>th</sup> grade students produced a higher number of tokens than 9<sup>th</sup> grade students in English, while in French means for the former were slightly lower and for the latter were largely the same. This is very likely due to the exposure that students receive in their CLIL classes: Physical Education, taught in both 9<sup>th</sup> and 10<sup>th</sup> grade, and Economics, taught in 10<sup>th</sup> grade. While this is consistent with suggestions by Dalton-Puffer (2008) and Heras and Lasagabaster (2015) that receiving content classes through the medium of a TL can improve content-related vocabulary, the current findings suggest that this is only the case for female students, and particularly so in English. It remains to be seen whether this is due solely to gender, or whether other factors, such as the school which students attended, may play a role.

## 5. Conclusion

This study sought to investigate the quantitative differences between Spanish male and female learners' LA in English and French in an upper secondary plurilingual CLIL context. Results showed that both male and female participants produce a higher number of tokens in English than in French, indicating that

gender generally does not affect the LA of these students in their different TLs. However, results of the cross-sectional analysis revealed that differences do arise between male and female learners, which appear to be related to the participants' CLIL classes and the content-related vocabulary to which students are exposed. These findings offer important implications for the design of CLIL programmes. As the results suggest that gender-related differences in each TL are most apparent across time, it is particularly important that plurilingual CLIL programmes are designed with these variations in mind. For example, this study showed that when taking into account both TLs, 10<sup>th</sup> grade males appear to produce a larger number of words than 9<sup>th</sup> grade males in the general prompt *Food and drink* and the content-related prompt *Economy and money*. This was not, however, the case for their female peers. In these cases, it appears that combining lexical knowledge in both TLs has offered older male students an advantage over their younger male peers. In practice, plurilingual programmes could benefit greatly from helping male students to take advantage of this possibility, by encouraging acquisition of conceptual vocabulary across both TLs (e.g., promoting cognate awareness to facilitate acquisition). On the other hand, it seems to be the case that 10<sup>th</sup> grade female students produce more tokens than 9<sup>th</sup> grade female students in English in prompts related to their English CLIL classes. However, the same advantage is not found in the prompts in French. It may thus be useful to offer female students additional exposure to French in the same topics, or again provide guidance on drawing on knowledge from one TL to help with the other.

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While these findings offer interesting insights into the LA of male and female learners in different TLs, there are a number of areas which may be addressed in future research. Firstly, participants in this study attended single-sex schools. While these were sister schools which largely followed the same curriculum, there are evidently variables in each context. It is therefore unclear whether the differences observed can solely be attributed to gender or to the specific learning environment in which the participants study. Future research would benefit from investigating the same issues in a mixed school in which both male and females attend the same classes with the same teachers. Secondly, while it was beyond the scope of this paper to include the data collection on language proficiency, this is undoubtedly an important factor which should be borne in mind. This is particularly so when dealing with LA, as it has been suggested that more advanced learners tend to produce a higher number of tokens in these types of tasks (van Ginkel and van der Linden in Schmitt 2000). Finally, as previously noted, one issue with the cross-sectional design of the study is that it may be unsuitable for monitoring sequential linguistic development of the learners over time and

cannot be used to assess individual differences (Wei and Moyer 2009). It would thus be beneficial to adopt a longitudinal approach in order to address these issues and better understand the effect the participants' linguistic exposure has over time and whether the findings observed here are attributable to group differences or to the exposure itself.

While the results of this study largely point to higher abilities in English, there are clear indications that CLIL instruction plays a key role in the development of content-related LA, and that male and female learners may respond differently to this instruction in each TL. It nonetheless appears that exposure to such content-related vocabulary may enable students to improve in these specific linguistic domains. In this vein, it is necessary for teachers and stakeholders to be made aware of this possibility, with the aim of using the learning context to students' advantage and to better support both male and female learners in the acquisition of LOTEs.

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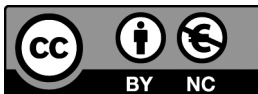
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