

## Producing cognitive discourse functions in disciplinary Basque writing: developmental patterns across secondary education and L1 profiles

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The authors report there are no competing interests to declare.

#### **Data availability**

Data cannot be shared.

## **Producing cognitive discourse functions in disciplinary Basque writing: developmental patterns across secondary education and L1 profiles**

The present study explores the developmental patterns of bilingual secondary education students in a disciplinary writing task in Basque, their language of instruction. A cross-sectional sample of 547 bilingual students (Years 7 to 10) enrolled in Basque Model D immersion programmes completed a source-based writing task requiring them to produce two cognitive discourse functions: *argue* and *compare*. Students reported to have either Basque, Spanish or both as their L1. The corpus was analysed with an analytical rubric that considered students' performance in three dimensions: arguing, comparing and using sources. Linear mixed models were used to assess the effect of Year and L1 on the three dimensions. Findings showed positive developmental patterns from Y7 to Y10 in all measures for all L1 profiles, with varying turning points. Most measures reached statistical significance when comparing two-year cycles. Similar developmental patterns were found in learners' writing, especially between Y7 and Y9, after which Basque L1 students improved and Spanish L1 students stagnated. Students having both as their L1 showed the most irregular patterns. In conclusion, results show developmental patterns in disciplinary cognitive discourse function production and source-based writing. Implications for the development of disciplinary literacies and bi/multilingual education are discussed.

### **KEYWORDS**

Cognitive discourse functions, disciplinary literacy, writing development, Basque, bilingual education

#### **1. Introduction**

All disciplines use subject-specific language to construct and communicate discipline-related knowledge (Shanahan & Shanahan, 2008). Mastering academic language and disciplinary literacies (DLs) is thus crucial for students' academic success (Dalton-Puffer et al., 2024; Durrant et al., 2021). Research focusing on Content and Language Integrated Learning (CLIL) and bilingual education has recently shifted towards a paradigm that highlights the specific discourse of disciplines, i.e., DLs. These have been defined as the ways in which discipline experts (scientists, historians, mathematicians) construct and communicate discipline-related knowledge (Coyle & Meyer, 2021; Dalton-Puffer et al., 2024; Shanahan & Shanahan, 2008). In essence, DLs start from the premise that disciplines create and organise knowledge differently (Christie & Maton, 2011), so that discipline-specific language is required to express discipline-specific concepts. Therefore, it is understood that each academic discipline has specific characteristics for communicating knowledge within a particular domain.

Students, therefore, are required to use subject-specific language to refer to discipline-specific concepts at different stages of their educational careers. In many cases, learners must perform disciplinary forms of writing, which are an essential characteristic of a discipline's nature (Costley & Flowerdew, 2017) and a frequent basis for grading and assessment. In this regard, educators and researchers alike need to consider the relationship between language and content when teaching and learning subject matter (Nikula et al., 2016). Especially in bilingual education contexts, this relationship draws the attention of educators, as many students learn subject content through a non-dominant language. Such is the case of this cross-sectional study, in which we analyse the developmental patterns of secondary education students' academic and disciplinary language written skills in a bilingual education context. In fact, we explore writing in the language of instruction, Basque, a minority language and the second language (L2) of the majority of students, while for others it is a

first language (L1). To this end, we focus on the construct of cognitive discourse functions (CDFs), examining students' ability to *argue* and *compare* in a source-based scientific writing (SBW) task across different levels of secondary education. Both CDFs and SBW have been proposed as important components of academic language and DLs, however, more research is needed to understand their development.

## 2. Literature review

### 2.1. Cognitive discourse functions

This article focuses on the construct of CDFs as proposed by Dalton-Puffer (2013), understanding them as one of the central elements of DLs (Dalton-Puffer et al., 2024). CDFs serve as a nexus between content, language and literacies (Morton, 2020). They can be seen as the linguistic realisations of thought and learning processes arising in educational contexts. In line with Zydatið (2010) or Kidd (1996), the scope of CDFs lies in academic functions that represent crystallised cognitive and discourse patterns used to express academic (disciplinary) knowledge in different educational contexts (Dalton-Puffer, 2013). These patterns “name concrete linguistic behaviours by which students are expected to demonstrate their content knowledge” (Dalton-Puffer 2013, p. 223), and manifest through operative verbs such as *define*, *argue* or *describe*. Following an extensive review, Dalton-Puffer (2013) categorised a list of more than 50 operative verbs according to their primary communicative intention, thus creating a 7-category construct: *categorise*, *define*, *describe*, *evaluate*, *explain*, *explore* and *report* (see Dalton-Puffer, 2013 for a detailed description). CDFs occur in the entire learning-teaching process in diverse forms and contexts, such as classroom interaction (Dalton-Puffer et al., 2018; Lersundi, 2023), competency-based educational curricula (Dalton-Puffer & Bauer-Marschallinger, 2019), or CDF-based tasks. In line with Gerns (2023a), we understand these as a type of task that 1) explicitly elicits students to perform one or more CDFs, and 2) is linked to disciplinary content verbalisation. Unlike other non-disciplinary communicative tasks, these are deeply rooted in disciplinary knowledge communication, and, therefore, require the production of disciplinary content and language in integration.

Regarding students' productions of written CDFs in CDF-tasks, previous studies have shown that learners can produce them at various performance levels. Diverse studies have focused on different CDFs, disciplines and languages. For example, the study by Nashaat-Sobhy and Llinares (2023) focused on *define* in L1 Spanish and L2 English in a CLIL History context, and found similarities between L1 Spanish and L2 English. In addition, when comparing primary and secondary education students, older students tended to use more diverse linguistic resources than younger learners. In a similar vein, Whittaker and McCabe (2023) examined students' written *evaluations* in Science, History and Art in L2 English (in CLIL), suggesting that learners tended to use few justifications, in contrast to high usage of evaluative/personal lexicogrammar. Also in History CLIL, Llinares and Nikula (2023) compared CLIL primary education learners' productions of all CDFs in Finnish and Spanish contexts in L2 English. Their study revealed different tendencies in students' production of certain CDFs, for example, *describe* elicited more and longer answers than others, whereas *evaluate* and *explore* showed higher syntactic complexity scores. The few instructional studies conducted using CDFs have found a positive effect of the interventions on student writing (Garro Larrañaga et al., 2024; Gerns, 2023a, 2023b; Rieder-Marschallinger, 2024; Roca de Larios et al., 2023), emphasising that learners might face challenges when producing CDFs irrespective of the language if they are not explicitly taught. However, developmental studies with CDFs are still underrepresented in the literature, and more research should be conducted to assess how specific CDFs develop. The following sections briefly describe the

two CDFs under study by characterising their main features.

### **2.1.1. Argue**

Learning to argue plays an important role in fostering critical thinking and global citizenship (Pylonitis & Meyer, 2024), which are fundamental aspects of XXI-century education (Coyle & Meyer, 2021). Andriessen and Baker (2022) expound that mastering argumentation helps students to justify their opinions by facilitating reflection. Argumentation has previously been conceptualised as using previous knowledge, evidence and reasoning to defend one's position (Dalton-Puffer, 2016). In the discipline of science, it is closely related to scientific inquiry (Sampson & Clark, 2008), as arguments are often based on interpretations of empirical evidence and/or experimental data (Martín-Gámez & Erduran, 2018; Polias, 2016). Consequently, scientific argumentation has been regarded as cognitively and linguistically challenging (Crossley et al., 2022).

At a discourse level, in line with Toulmin's Argument Pattern (TAP) (Toulmin, 1958), *argue* as a CDF entails producing at least two basic elements: a claim and supporting data (Erduran, 2007; Qin & Karaback, 2010). Furthermore, previous studies have highlighted that successful arguments also require other complementary yet complex elements, such as justifications for the data (warrants), as well as including and refuting potential counterarguments (Garro Larrañaga et al., 2024; Liu & Stapleton, 2014).

As highlighted by previous studies, students often fail to produce sufficiently effective scientific arguments, as they often make claims without using supporting evidence (Erduran, 2007), and experience challenges in the production of warrants, counterarguments and/or rebuttals (Kuhn & Modrek, 2022; Qin & Karaback, 2010). The lack of inclusion of the latter might be due to what has been coined *myside bias*, which would entail students neglecting and thus not including information not supporting their point of view. According to van Weijen et al. (2019), this effect was more likely in L2 texts, which tended to be more straightforward, while students typically included both supporting arguments and counterarguments in their L1 texts. Despite the complexities of producing scientific arguments, previous studies have revealed that it is an ability that can be taught in any language (Garro Larrañaga et al., 2024; Mombaers et al., 2024). In his longitudinal study of university students, Jackson (2024) found that learners produced better arguments after almost a year, with elements related to counterarguments and rebuttals showing a higher increase. It could be assumed, therefore, that more skilled writers will produce better arguments in terms of completeness (i.e., including all elements), justifications and quality (Jackson, 2024; Sampson & Clark, 2008; Sendur et al., 2020; Whittaker & McCabe, 2023).

### **2.1.2. Compare**

Comparisons are a fundamental aspect of thinking as they allow for expanding existing knowledge structures by creating and connecting new knowledge (Tullis & Goldstone, 2016). Learning to compare successfully is crucial for educational purposes so that students can achieve deeper learning (Coyle & Meyer, 2021). Comparing has previously been defined as the act of exploring similarities and differences between two things (Namy & Gentner, 2022), therefore establishing connections and "disjunctures" between concepts (Dalton-Puffer, 2016, p. 34). Comparing is understood as a sub-form or a pre-requisite of the CDF *categorise* (Evnitskaya & Dalton-Puffer, 2024) or *evaluate* (Chen & Zhou, 2022). In line with Medin and Goldstone (1995), comparing involves *expressing how A is similar (or different) to B by considering aspect C according to comparative process D*. In the literature on

comparing, its complexity has been debated. Some studies suggest that it is a less demanding function (Anderson & Krathwohl, 2001; Llinares & Nikula, 2023), while others have acknowledged that finding (dis)connections between concepts is a challenging task (Chen & Zhou, 2022). Nonetheless, there seems to be a consensus that learning to compare is pivotal in the learning-teaching process (Gerns, 2023a, 2023b), as well as in science education (Trimble, 1985; Polias, 2016).

Considering the main features of *comparing* as a CDF, previous studies (see Chen & Zhou, 2022; Gerns, 2023a, 2023b; Evnitskaya & Dalton-Puffer, 2023, 2024) have identified some of the main components required to produce comparisons: the concepts being compared, the basis of comparison<sup>1</sup> and the comparative structure. Concepts being compared are indispensable and must appear in all comparisons (Chen & Zhou, 2022). The basis of comparison represents the property or criterion used to establish similarities or differences between the concepts explicitly or implicitly (Evnitskaya & Dalton-Puffer, 2023). Finally, the comparative structure refers to the organisation of the comparison: a point-by-point comparison, or a block-method comparison (see Gerns, 2023a). All studies mentioned above suggest that comparisons are produced in different directions, i.e., based on similarities or differences. At a lexicogrammatical level, lexical and grammatical items to express comparisons have been identified, such as nouns (*resemblance, difference, disparity*), verbs (*differ, look alike*) or grammatical comparative forms (*happier, more complex*).

Regarding students' performance in producing comparisons, learners have been found to use more difference-based comparisons than mentioning similarities between concepts (Gerns, 2023a, 2023b; Evnitskaya & Dalton-Puffer, 2023, 2024). Gerns (2023a, 2023b) found that instruction on comparisons helped improve students' performance, as they tended to accompany the concepts being compared with a contextualization and to mention the basis of comparison more explicitly. In addition, students were able to produce structured comparisons after instruction, an aspect that was challenging for them before. Furthermore, when comparing year 6 and year 8 students, Evnitskaya and Dalton-Puffer (2024) observed an increase in the number of implicit comparisons and a decrease in the use of lexicogrammatical forms of comparatives, probably due to higher conceptual complexity and abstractness of the ideas expressed.

## **2.2. Source-based writing**

Therefore, CDFs represent the cognitive and discourse resources that students need to perform academic tasks. Among these tasks, source-based writing tasks (SBW) have been highlighted as crucial for academic language (Cheong, Zhu & Xu, 2021). By using subject-specific and academic content, SBW tasks require students to activate comprehension and production simultaneously (Yang & Plakans, 2012), as writers need to comprehend information from a given source (which could be multimodal), interpret it and then use said information to create written compositions (Cheong, Zhu & Liao, 2018; Cheong, Zhu & Xu, 2021). Often, the production part of SBW tasks demands that students produce certain CDFs, with *argue* and *report* being the most common (Chan & May, 2022). Therefore, the processes involved in understanding and transforming the source to produce appropriate compositions are key (Ye & Ren, 2023) in the production of DLs and CDFs. Different aspects of SBW have been extensively studied in the literature, such as students' strategies to borrow information from the sources (e.g., Arias-Hermoso et al., 2024; van Weijen et al., 2019) or the relationship between task quality and writing features (e.g., Uludag & McDonough, 2022). Some studies have focused on

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<sup>1</sup>The basis of comparison has also been named "comparative criteria" (Gerns, 2023a, 2023b) or "dimension" (Chen & Zhou, 2022).

across-language comparisons, and overall have suggested that although strategies to use sources are normally learner-specific and transferable across languages (Arias-Hermoso et al., 2024; Cheong, Zhu & Xu, 2021; van Weijen et al., 2019), studies have also reported some differences when writing from sources in L1 or L2. For instance, students have been found to copy more in additional languages than in L1 (Arias-Hermoso et al., 2024; van Weijen et al., 2019), to spend more time using the sources in L2/L3 than in L1 (Chau et al., 2022) or an overall better use of sources in L1 than in L2 (Kato, 2018). However, to our knowledge, no study has yet focused on how the ability to write from sources evolves across secondary education.

As mentioned before, research on the development of CDFs is still in its early stages, with some aspects regarding students' progression in their production still unclear. While it is generally assumed that learners' disciplinary and academic language skills evolve over time (del Pozo, 2024; Granados et al., 2022; Lorenzo, 2017; Staples et al., 2023), leading to more complex and complete texts, the specific elements that change and improve are yet to be explored. Furthermore, the study of writing development has normally focused on other dimensions, such as genre (e.g., Larrigan et al., 2015), syntactic and lexical complexity, accuracy, or grammatical structures (for a review, see Durrant et al., 2021), with still limited attention to the structural features of CDFs or SBW. Furthermore, most research exploring writing development has focused on English as an L2/FL (e.g., Durrant et al., 2021; Granados et al., 2022; Staples et al., 2023), with other languages still underexplored.

Furthermore, while research on CDFs comparing L1 and L2 production might shed some light on the matter, the role of different L1 profiles is still an underexplored topic in DLs. Although writing development research has considered the role of learners' L1 to some extent, it has mostly been conducted with English L2 writing (e.g., Shen et al., 2023), and the influence of L1 on the development of DLs requires further exploration. This gap is particularly evident in the Basque Autonomous Community (BAC), where many learners are exposed to a language of instruction other than their L1. Some previous studies in the BAC have compared students' productions with different L1s (Elosua & De Boeck, 2020; Elosua & Lasagabaster, 2025; Sagasta, 2003), and suggest that, on the whole, L1 Basque speakers tend to outperform L1 Spanish speakers in educational achievement and writing performance. Elosua and De Boeck's (2020) study additionally shows that Basque-immersion has a strong positive effect on students' achievement. Nevertheless, these studies have not focused on writing development or DLs; and understanding these in a multilingual context is crucial.

Consequently, the main objective of this article is to address the aforementioned gaps by exploring the developmental patterns (defined here as significant increases or decreases in year-to-year comparisons) of different L1 profile learners when producing two CDFs (*argue* and *compare*) in a source-based scientific writing task. Consequently, these research questions are addressed:

- **RQ1.** Which developmental patterns take place in secondary education students' written production of *argue*? Do the patterns vary by L1 profile?
- **RQ2.** Which developmental patterns take place in secondary education students' written production of *compare*? Do the patterns vary by L1 profile?
- **RQ3.** Which developmental patterns take place in secondary education students' use of sources? Do the patterns vary by L1 profile?

### 3. Methodology

### 3.1. Sample

The sample for this study was composed of a total of 547 secondary education students (from Year 7 to Year 10, 12-16 years old) enrolled in five different public schools in the BAC. All were enrolled in the Basque Model D programme, which is a Basque-medium instruction programme that is intended to foster the acquisition of Basque for non-Basque L1 speakers, as well as a Basque-language maintenance programme for Basque L1 learners (Sagasta, 2003). For a detailed description of the language Models in the BAC, see Cenoz (2023). This linguistic model provides students with a relatively high amount of exposure to the Basque language at school, with all subjects being taught through the medium of Basque, except for Spanish and English, which are taught as separate languages. Consequently, students enrolled in Model D receive approximately 26 hours of weekly school exposure to Basque, accounting for 936 yearly hours in said language. Basque and Spanish are taught as language arts classes, with a focus on developing communicative competence.

Participants in this study were selected from five different schools across the three territories of the BAC (Bizkaia, Gipuzkoa and Araba), which was carefully planned to achieve a representative sample of students from different sociolinguistic contexts: schools A and B were located in Spanish-dominant areas, schools C and D in mixed Basque-and-Spanish-speaking contexts and school E in a mainly Basque-speaking area. The *sociolinguistic context* variable was identified for each school based on the number of Basque and Spanish speakers according to an official survey. At least two groups from each Year in all five schools participated in our study. Students who reported having a language other than Basque (BA), Spanish (SP) or both (BASP) as their L1 ( $n = 22$ ) were excluded from the sample. Table 1 shows the number of participants included in the analysis in each school divided by Year and Reported L1.

**Table 1**

*Number of participants (n) per school, year and reported L1*

|          | School * Year |            |            |            | School * Reported L1 |            |           | n          |
|----------|---------------|------------|------------|------------|----------------------|------------|-----------|------------|
|          | Year 7        | Year 8     | Year 9     | Year 10    | BA                   | SP         | BASP      |            |
| School A | 25            | 34         | 34         | 28         | 1                    | 118        | 2         | <b>121</b> |
| School B | 30            | 25         | 22         | 26         | 15                   | 76         | 12        | <b>103</b> |
| School C | 21            | 33         | 35         | 13         | 45                   | 33         | 24        | <b>102</b> |
| School D | 27            | 38         | 12         | 24         | 32                   | 51         | 18        | <b>101</b> |
| School E | 34            | 30         | 32         | 24         | 61                   | 38         | 21        | <b>120</b> |
| n        | <b>137</b>    | <b>160</b> | <b>136</b> | <b>115</b> | <b>154</b>           | <b>316</b> | <b>77</b> | <b>547</b> |

### 3.2. Data collection and procedure

Students in the sample completed a SBW task, in which they were presented with a written source and were asked to select the most important information for the subsequent writing essay. A curriculum-relevant Science topic worked on across secondary education in the BAC was selected, i.e., Nutrition and Health. They were asked to respond to a complex CDF task in which two CDFs are intertwined (Breeze & Dafouz, 2017). Accordingly, they had to compare two foods (chicken and chocolate) and argue which was the healthiest. They were asked to use information from the source (and also include their own ideas if they wanted to) but not copy it literally to write texts of around 150 words for the school blog. To measure students' performance in the SBW disciplinary task, the source was specifically designed and piloted for this study (see Arias-Hermoso et al., 2024).

Participants were given 3 minutes to read the source and take notes, which they could later use in the writing process. While this is a short period of time, the pilot study showed that it was sufficient for students to take relevant notes for the essays. 25-30 minutes were given to write the texts based on the source. Students also completed the same task in two other languages (Spanish and English) and another discipline (History), but this study only focuses on science texts in Basque. Written tasks were carried out in a pseudo-random order in order to minimise potential task repetition effects, therefore, students were divided into three random groups, each of which started with one of the languages. All completed the science texts on the first week, followed by the history texts 7-14 days later. The tasks were completed by hand, and a researcher and school teachers were present to ensure that the schedule was completed correctly. In addition to the written essays, participants were asked to complete a sociolinguistic background questionnaire (Soziolinguistika Klusterra & ISEI-IVEI, 2018).

The legal guardians or parents of the participants were informed of the nature of the tests, and written consent forms were collected. The research received approval from the Ethics Committee from XXX University (IEB-20231218).

### 3.3. Data analysis

Rubrics have been frequently used in education and/or language testing contexts, as they can provide a detailed and systematic description of a learner's performance in certain tasks. In the case of the assessment of CDFs, rubrics have received some attention (Bauer-Marschallinger, 2022; del Pozo & Llinares, 2021; del Pozo, 2024). However, most of these scales consider the CDF as a whole (e.g., Granados & Lorenzo, 2024). In line with del Pozo (2024), it is necessary to assess multiple components of the production of CDFs, which will provide a more comprehensive understanding of their complexity. Therefore, an analytic rubric was developed and validated through expert judgement using a DELPHI method. The detailed validation procedure is described in Arias-Hermoso et al. (under review). The rubric validation process consisted of five steps, which are outlined below:

- **STEP 1: Literature review and V1.** A first version of the rubric (V1) was created based on previous literature measuring students' argumentation skills (Erduran, 2007; Toulmin, 1958; Qin & Karaback, 2010), comparison skills (Evnitskaya & Dalton-Puffer, 2023, 2024; Gerns, 2023a, 2023b) and SBW skills (Cheong, Zhu & Xu, 2021; van Weijen et al., 2019; Yang & Plakans, 2012). After defining these three main dimensions, a first version of the items comprising each dimension was developed. Argumentation (D1) and comparison (D2) each had 4 items, and SBW (D3) had 2. Each was given a value from 0 (non-existent or poor) to 3 (excellent).
- **STEP 2: Expert judgement round 1.** V1 was sent to 13 experts who had extensive experience working with CDFs and disciplinary literacies at different levels. Most were experts in Applied Linguistics, but experts in Science or History education were also contacted. An evaluation matrix was designed for them to give a rating between 1 and 5 for each item's pertinence, clarity, coherence and relevance, as well as for them to give qualitative feedback for improvement.
- **STEP 3: Analysis of evaluation and modifications.** Judges' evaluations were analysed quantitatively and qualitatively, and modifications to the V1 of the rubric were made. A full report including all the changes was created and sent along with the modified version (V2) to the judges. Most modifications occurred in D2, for which an item was erased, and another added, and in D3, for which an item was split into two.

- **STEP 4: Expert judgement round 2.** The same process as in Step 2 was carried out, however, only 6 judges agreed to do the second round (the remaining 7 declined the invitation due to time reasons). This was deemed sufficient for the purposes of the study.
- **STEP 5. Final version.** Judges' evaluations were analysed again quantitatively and qualitatively, and minimal changes were made due to the received ratings. Experts agreed that the rubric was valid, as suggested by the means in their responses (all above 4/5). While no inter-rater reliability analysis was conducted, the final version was piloted by three researchers with 12 texts until reaching a total agreement. Then, the first author conducted the rest of the analyses.

The rubric was designed to be used for multiple languages and disciplines. Its final version was then employed to analyse the corpus of 547 disciplinary texts in Basque. Each text was given a score for each item of the rubric, ranging from 0 to 3. The definition of each item of the rubric can be seen in Figure 1. It is important to note that spelling errors were not rated with the rubric, which could be related to using lexicogrammar accuracy.

**Figure 1**

*Definitions of 11 items for the three dimensions*

| D1: ARGUMENTATION SKILLS                         |                                                                                                                                                                                                                                               | D2: COMPARISON SKILLS                 |                                                                                                                                                                                                                                                               | D3: SOURCE-BASED WRITING                        |                                                                                                                                                                                                   |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Stance-taking (D1_ST)</b>                     | This is defined as the writer's ability to express their claim or position towards the topic and take a stance.                                                                                                                               | <b>Comparative items (D2_CI)</b>      | This is defined as the writer's ability to produce comparisons between the two concepts, by including differences and/or similarities, and elaborating on them.                                                                                               | <b>Use and comprehension of sources (D3_UC)</b> | This is defined as the writer's ability to convey their comprehension of the sources through the use of sources accurately in a relevant way.                                                     |
| <b>Reasoning (D1_R)</b>                          | This is defined as the writer's ability to provide supporting data and warrants to justify their stance.                                                                                                                                      | <b>Comparative criteria (D2_CC)</b>   | This is defined as the writer's ability to explicitly express the comparative criteria, i.e., the bases of comparison (the criterion according to which the similarities/differences are being made).                                                         | <b>Degree of transformation (D3_DT)</b>         | This is defined as the writer's ability to transform the information from the sources via paraphrasing (lexical and structural changes).                                                          |
| <b>Counterargumentation and rebuttal (D1_CR)</b> | This is defined as the writer's ability to acknowledge and refute opposing views to their claim, by providing counterarguments and rebuttals based on data.                                                                                   | <b>Comparative structure (D2_CS)</b>  | This is defined as the writer's ability to organise the comparisons logically, at sentence, paragraph and text levels.                                                                                                                                        | <b>Inclusion of original ideas (D3_O)</b>       | This is defined as the writer's ability to include ideas not present in the sources, (original ideas from the writer's background) by appropriately integrating external knowledge into the text. |
| <b>Language for arguing (D1_LA)</b>              | This is defined as the writer's ability to use appropriate, accurate and varied lexicogrammatical resources to produce argumentation elements, including connectives, words to express cause and effect, evaluative language, modalisation... | <b>Language for comparing (D2_LC)</b> | This is defined as the writer's ability to use appropriate, accurate and varied lexicogrammatical resources to produce comparisons, including compare/contrast connectives, lexical and grammatical forms to express difference/similarity, juxtapositions... |                                                 |                                                                                                                                                                                                   |

Due to the data's ordinal and not-normally distributed nature, we used Linear Mixed Models (LMMs), which support non-parametric tests with multiple variables, including fixed and random effects (see Gries, 2015). For the model, school and sociolinguistic context were included as random effects, age and L1 as fixed effects, and each item as the independent variable. For all items under study, the *lme4* and *lmerTest* packages in R were employed to run the LMMs. They were followed by Wald tests, which were used to test the effect of the fixed effects (Year and L1). Subsequently, post hoc Tukey pairwise comparisons were performed to evaluate year-related differences across the three L1 profile groups (using the *emmeans* package).

#### 4. Results

This section presents the descriptive statistics (see Table 2) and the results from the Wald chi-square tests. The Wald tests aimed to assess the effect of each fixed factor (*Year* & *L1*) and their interaction. Then, we address each RQ and dimension separately in more detail. LMM analyses showed very low variance explained by *school* and *sociolinguistic context* (variances below 0.018), and they were excluded from the subsequent analyses. On the whole, the Wald tests showed an effect of Year for all 11 items at the  $p < 0.001$  level, ( $\chi^2$  values ranging from 56.43 to 15.95) and at the  $p = 0.047$  for D3\_O ( $\chi^2(3) = 7.941$ ). Similarly, L1 significant effects were found for 7 items: D1\_R, D1\_LA, D2\_CI, D2\_CS, D2\_LC, D3\_UC and D3\_DT ( $p$  values between 0.001 and 0.039), as well as an interaction effect between Year and L1 for D2\_CS ( $\chi^2(9) = 17.610$ ,  $p = 0.039$ ) and D3\_DT ( $\chi^2(9) = 18.78$ ,  $p = 0.027$ ). To investigate these effects further, we explore the developmental patterns per dimension in the following sub-sections. Students with Basque as their L1 will be referred to as BA, those with Spanish as SP, and balanced bilinguals BASP. The pairwise comparisons with contrast estimates (CEs) and significance for each combination can be observed in Appendix 1, and student examples from Year 7 and Year 10 are offered in Appendix 2.

**Table 2**

*Mean scores per item, divided by Year and L1 (all dimensions)*

|                       |     | D1_ST | D1_R  | D1_CR | D1_LA | D2_CI | D2_CC | D2_CS | D2_LC | D3_UC | D3_DT | D3_O  |
|-----------------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L1 Basque             | Y7  | 1.875 | 1.65  | 1.35  | 1.275 | 1.425 | 0.525 | 0.8   | 1.225 | 1.8   | 0.7   | 0.275 |
|                       | Y8  | 2.023 | 1.977 | 1.5   | 1.773 | 1.773 | 0.75  | 1.068 | 1.455 | 2.045 | 0.977 | 0.545 |
|                       | Y9  | 2.179 | 2.077 | 1.692 | 2.026 | 1.974 | 1.308 | 1.59  | 1.769 | 2.128 | 1.256 | 0.615 |
|                       | Y10 | 2.563 | 2.5   | 2.094 | 2.625 | 2.281 | 1.406 | 1.969 | 2.188 | 2.5   | 1.875 | 0.813 |
| L1 Basque and Spanish | Y7  | 1.917 | 1.333 | 1.167 | 1.167 | 1.333 | 0.417 | 0.833 | 1.167 | 1.667 | 0.75  | 0.667 |
|                       | Y8  | 1.889 | 1.556 | 1.222 | 1.278 | 1.444 | 0.556 | 0.722 | 1.556 | 1.889 | 0.722 | 0.167 |
|                       | Y9  | 1.944 | 1.944 | 1.611 | 1.778 | 2.111 | 1.111 | 1.722 | 1.611 | 2.111 | 1.222 | 0.611 |
|                       | Y10 | 2.375 | 2.25  | 1.792 | 2.25  | 2.125 | 1.458 | 1.792 | 2     | 2.333 | 1.667 | 1.13  |
| L1 Spanish            | Y7  | 1.512 | 1.28  | 0.927 | 0.902 | 1.195 | 0.354 | 0.768 | 0.805 | 1.549 | 0.549 | 0.341 |
|                       | Y8  | 1.896 | 1.688 | 1.26  | 1.448 | 1.625 | 0.74  | 1.073 | 1.313 | 1.833 | 0.885 | 0.594 |
|                       | Y9  | 2.013 | 2.027 | 1.613 | 2.053 | 1.813 | 1.04  | 1.427 | 1.653 | 2.12  | 1.293 | 0.693 |
|                       | Y10 | 2.237 | 1.983 | 1.712 | 2.085 | 1.898 | 1.254 | 1.203 | 1.729 | 2.017 | 1.22  | 0.627 |

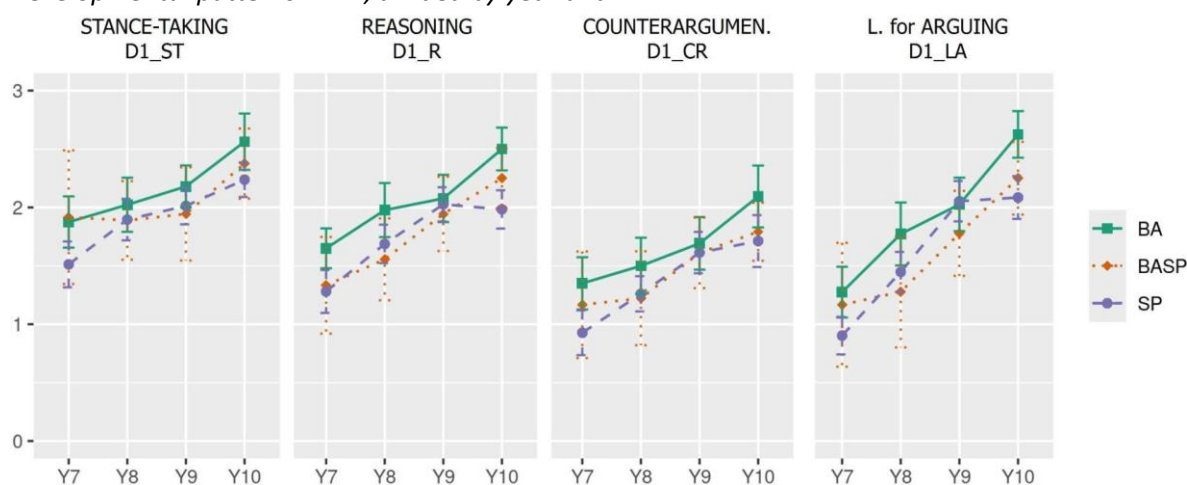
##### 4.1. RQ1. Which developmental patterns take place in secondary education students' written production of *argue*? Do the patterns vary by L1 profile?

The results show that, on average, all groups had relatively high values in Y7 for *stance-taking* and *reasoning* (above 1.5 out of the maximum 3), showing that students in the first year of secondary education were already mostly able to produce clear opinions and use some data to support those. BA students often performed statistically slightly better than their SP counterparts (see Table 2). Regarding the developmental patterns, as can be seen in Figure 2, all groups showed significant differences (all  $ps < 0.001$ ) from Y7 to Y10 in *reasoning* and *language for arguing*, but for *stance-taking* and *counterargumentation* the increases from Y7 to Y10 were only significant for students in the

Basque L1 and Spanish L1 profiles.

**Figure 2**

*Developmental patterns in D1, divided by year and L1*

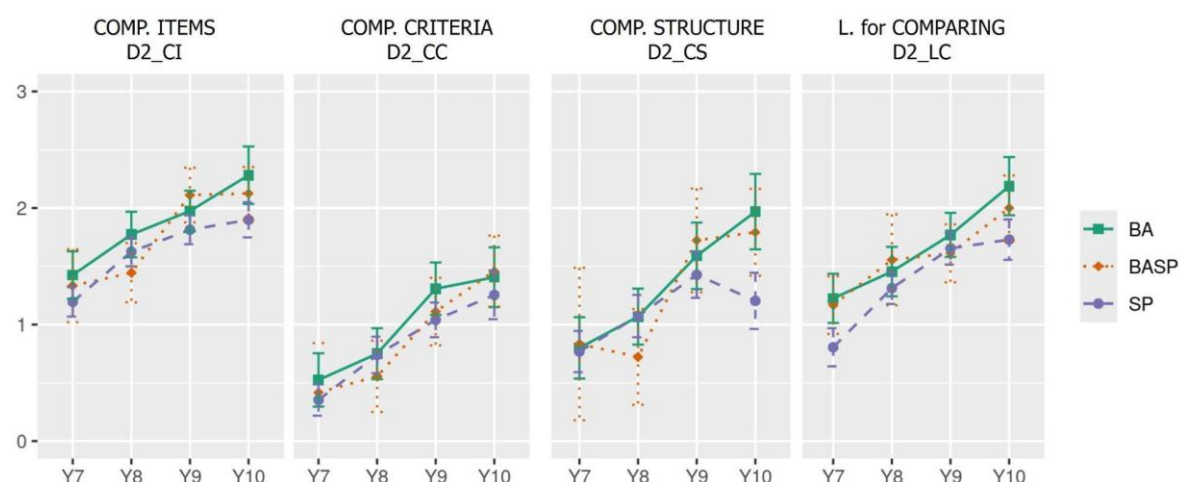


Regarding the pairwise comparisons, BA students showed significant improvements from Y7 to Y10 (all  $p$ s < 0.001) in all measures, in addition to significant development from Y8 to Y10, suggesting that the steepest improvements took place after Y8. It has to be noted that the slopes between Y8 and Y9 were relatively flat; consequently, no comparison was significant for that combination. BASP students, as mentioned, did not reach significant change for *stance-taking* and *counterargumentation*. However, they showed significant changes from Y7 to Y10 in *reasoning* ( $CE = -0.8813$ ,  $p = 0.002$ ) and *language for arguing* ( $CE = -1.1163$ ,  $p < 0.001$ ), suggesting a gradual but consistent turning point. Students that had Spanish as their L1, despite lower scores than the other two groups overall, had a substantial and significant improvement in all items until Y9, where they reached a plateau and did not show change any longer. The SP group, therefore, showed the steepest year-on-year developments across all variables.

#### 4.2. RQ2. Which developmental patterns take place in secondary education students' written production of *compare*? Do the patterns vary by L1 profile?

Overall, results show that all learners over time tend to make better comparisons by including more explicit comparisons between the two elements, as well as a better comparative structure and more varied and richer comparative language (see Figure 3), as shown by the post-hoc test results (Appendix 1). However, it reached stagnation for both SP and BASP learners after Y9. In general, all learners had difficulties establishing the comparative criteria on which the comparisons were based. There were only very few instances of the maximum performance level, which is reflected in the low average scores both at the beginning of secondary education and at the end (lower than 1.5 in Y10).

**Figure 3**  
Developmental patterns in D2, divided by year and L1



BA students' writing showed a gradual increase from Y7 to Y10 in all four measures of D2, with two-year cycles (i.e., Y7 and Y9, Y8 and Y10) and Y7-Y10 always being significant. Additionally, the increase from Y7 to Y8 was also significant in *comparative items* (CE: -0.3502,  $p = 0.03$ ) and from Y8 to Y9 in *comparative criteria* with a steep slope (CE: -0.5306,  $p = 0.003$ ). BASP learners, however, exhibited irregular patterns, with stagnation between Y7-Y8 and Y9-Y10, but a steep significant improvement from Y8 to Y9 in *comparative items* (CE = -0.665,  $p = 0.004$ ) and *comparative structure* (CE = -0.993,  $p = 0.003$ ). In contrast, they only showed a slight positive trajectory in *language for comparing*, statistically significant only when comparing Y7 and Y10 ( $p = 0.001$ ). In the case of SP learners, there was an overall significant improvement from Y7 to Y9 in all items, followed by stagnation from Y9 to Y10, as in most items in D1. As with Basque L1 learners, Spanish L1 students' trajectories in D2 also showed significant differences between two-cycles. The only exception was the comparison between Y8 and Y10 in *comparative structure* in SP learners, which was not significant due to the decrease after Y9.

#### 4.3. RQ3. Which developmental patterns take place in secondary education students' use of sources? Do the patterns vary by L1 profile?

As can be seen in Figure 4, this dimension showed very different performance levels across items, as students were mostly able to use and comprehend the sources appropriately already by the beginning of secondary education. The degree of transformation scores showed a great increase from Y7 to Y10 overall, indicating that students tended to copy less and paraphrase more, using syntactic and lexical changes to transform the source. Finally, the use of original ideas, although there is some increase over time (significant from Y7 to Y10 for BA and SP learners, and from Y8 to Y10 for BASP learners), did not reach high values (in Y10, below 1.5 out of 3), indicating the difficulties for students to include their own ideas in the writing pieces.

**Figure 4**

*Developmental patterns in D3, divided by year and L1*



Regarding across-L1 differences, BA and BASP learners exhibited similar developmental patterns overall in the *use of sources* (BA from 1.125 to 2.188; BASP from 1.167 to 2) and *degree of transformation* (BA from 1.8 to 2.5; BASP from 1.667 to 2.33), with a gradual increase from Y7 to Y10 (all  $ps < 0.02$ ). The differences were significant only when comparing 2-year cycles, and Y9-Y10 for BA learners. SP students showed a similar pattern to most items in D1 and D2, with a general increase from Y7 to Y9, and then stabilising from Y9 to Y10. The *use of original ideas* had the most irregular pattern, with statistically significant differences mostly found between Y7 and Y10 for BA and SP students. In contrast, BASP students' trajectory was highly irregular, with a better performance in Y7 than the other two groups, followed by a steep decrease to Y8, and then a steep increase from Y8 to Y10.

## 5. Discussion

The present study has sought to explore developmental patterns across secondary education when producing two CDFs in a source-based writing task, considering learners' different L1 backgrounds.

RQ1 focused on students' argumentation skills. The significant results show an overall increase in all measures from Y7 to Y10, suggesting that students produce clearer opinions, as well as better supporting evidence, counterarguments and more varied lexicogrammar. Students in our sample showed a relatively good command of *stance-taking* and *reasoning* already in the first year of secondary education (values above 1.5/3), which gradually increased towards Y10. This is in line with Jackson (2024), who also reported students' stance-taking to be high at the beginning of his longitudinal study, as well as with the study by Whittaker and McCabe (2023), which suggests that older students produce more justifications for their claims. The mean score increase in *reasoning* and *counterargumentation and rebuttal* shows that older writers were able to produce more complex elements, such as warrants and rebuttals (Liu & Stapleton, 2014; Sendur et al., 2020; Qin & Karaback, 2010). Still, the use of explicit rebuttals continued to be a complex matter, as shown by the values in *counterargumentation* (Arias-Hermoso et al., 2024; Qin & Karaback, 2010). The lexicogrammar dimension indicated the steepest change from Y7 to Y10, with learners showing more explicit marking and a greater diversity of lexicogrammatical resources to express arguments, in line with previous studies comparing CDF productions across different age groups (Evnitskaya & Dalton-Puffer, 2024; Nashaat-Sobhy & Llinares, 2023; Lorenzo & Dalton-Puffer, 2016). Regarding L1 profiles, some similarities and differences could be observed in the developmental patterns. Basque L1 and Spanish

L1 students tended to show parallel development from Y7 to Y9, after which Spanish L1 students stagnated, but Basque L1 students continued improving, with some significant slopes. Learners having both languages as their L1s showed non-significant changes in 2 items and the same pattern to Basque L1 students in the other 2.

Regarding RQ2, a gradual increase in all comparative elements was found, with more explicit comparisons and better comparative structures emerging over time (Gerns, 2023a, 2023b). Similar to the findings from previous studies, there was a prevalence of difference-based comparisons (Chen & Zhou, 2022; Evnitskaya & Dalton-Puffer, 2023, 2024; Gerns, 2023a), with mentions of similarities between both foods being somewhat scarce in the texts. Although it displayed a positive trajectory, learners had difficulties articulating the *comparative criteria*, probably due to its very abstract nature (Chen & Zhou, 2022; Gerns, 2023a, 2023b). Finally, the use of comparative language also showed a steep improvement, nevertheless, it has to be acknowledged that many students presented difficulties when using the Basque comparative/superlative structure, and younger learners used less accurate structures. Interestingly, despite the assumption that comparing might be cognitively easier than arguing (Anderson & Krathwohl, 2001; Llinares & Nikula, 2023), students generally had lower scores in this dimension than in arguing. It could be argued that this is due to the educational context in the BAC, in which students are often asked to write their opinions in structured genres, such as opinion letters or argumentative essays (see Larringan et al., 2015). However, they are hardly asked to write explicit comparisons about two elements. When examining L1 differences in the patterns, similar trajectories to D1 were found in this dimension, with Basque learners showing a generally positive but gradual increase, Spanish L1 learners showing stagnation after Y9, and students having both as L1s with irregular patterns. In this case, BASP learners showed steep increases between Y8 and Y9, and flatter slopes in other combinations.

Finally, answering RQ3, SBW showed very different performance levels across items. Students were already able to understand and use the sources at the beginning of secondary education, but older students still outperformed younger ones. The *degree of transformation* measure showed the greatest increase from Y7 to Y10 in all language combinations, suggesting that students were increasingly able to use their own words in the composition process (Cheong, Zhu & Liao, 2018; Yang & Plakans, 2012), possibly due to maturation or language proficiency (Cheong, Zhu & Xu, 2021; Sendur et al., 2020; van Weijen et al., 2019). Despite students being encouraged to include their own ideas in the compositions, their use was still scarce in all Years. This effect is probably due to the cognitive complexity of connecting previous knowledge with the source information (Arias-Hermoso et al., 2024; Cheong, Zhu & Xu, 2021). As in the other dimensions, Basque learners showed a gradual and consistent increase, L1 Spanish learners stagnated after Y9 and BASP students showed more irregular patterns.

All in all, the findings from this study have led us to conclude that there are indeed developmental patterns in the production of CDFs and the use of sources. This was especially evident when comparing two-year cycles, as year-by-year comparisons might not always be significant. Similar to Granados et al. (2022), our study also shows that students' academic language develops across secondary education (Tang, 2016), showing them to become increasingly literate in the discipline. In addition, the parallel increase in all dimensions might indicate that older students in the sample showed a better command of complex CDFs throughout secondary education, i.e., the ability to use combine CDFs at once (Breeze & Dafouz, 2017; Lorenzo, 2017). Finally, our study indicated that L1 Basque students

outperformed their peers, in line with previous studies in the BAC (Elosua & De Boeck, 2020; Elosua & Lasagabaster, 2025; Sagasta, 2003). Despite the higher overall scores of L1 Basque learners, we found some similarities and differences in the developmental patterns of different L1 profiles (Granados et al., 2022; Shen et al., 2023; Staples et al., 2023). As previously noted, Basque L1 and Spanish L1 students tended to show parallel developmental patterns from Y7 to Y9, but the patterns for Spanish L1 learners stagnated from Y9 to Y10. BASP students showed irregular patterns, with diverse steep improvement points, as well as plateaus. On the whole, future studies need to explore these differences and the potential causes of the patterns, not least by comparing students' performance in their other languages. This could shed light, for instance, on why plateaus consistently occur in Spanish L1 learners' writing production after Y9, which might be caused by cognitive overload of studying in a L2 or motivation towards the language.

## 6. Conclusions

This study sought to explore developmental patterns across secondary education of disciplinary literacies in a Basque immersion context, by considering learners' L1s. The findings from this study have led us to conclude that there are indeed certain developmental patterns of DLs, with overall more complex and complete CDF productions, as well as a better use of sources in the later years of secondary school. Our study makes several contributions to the fields of DLs, writing development and multilingual education. The findings provide insights into the developmental trajectories of DLs, CDFs and SBW, an area that remains relatively unexplored. Additionally, it broadens previous writing development research by using a functional approach (a rubric instead of complexity, accuracy and fluency measures). Furthermore, it highlights the multicomponent and non-linear nature of both writing development and DLs, offering a more nuanced understanding of these. Finally, our study includes an underrepresented context by examining writing in Basque in an immersion setting, expanding current research on (L2) writing development and DL to languages other than English. Specifically, this study shows that learners' L1s need to be considered among other individual factors in writing development research.

Nonetheless, some limitations to this study have to be acknowledged. First, a cross-sectional design was used due to time constraints. Adopting a longitudinal design using the same rubric could provide some clarification by controlling for student variability over time. Second, although the use of a complex/combined CDF task is interesting to see how students produce two CDFs at the same time (Breeze & Dafouz, 2017), the combination of *argue* and *compare* might have affected the appearance of certain elements, such as counterarguments, whose presence may have been influenced by the comparative nature of the task. In addition, the limited number of students having "other" as their L1 led to their exclusion from the sample, and it would have shed some light on immigrant learners' language learning process (Urionaguena et al., 2025). Additionally, the use of the source might have also influenced the written outcomes, so further research could address a similar prompt with independent writing, as well as exploring the moderating effects across dimensions. Future studies could consider comparing learner texts in their L1s and L2s with comparable groups to better understand if, for example, L1 Spanish and L1 Basque learners perform equally well in their L1s. Furthermore, using the rubric in other disciplines (such as maths or history), language combinations or age groups would be beneficial to have a deeper comprehension of the developmental patterns across different curricular contexts.

Our results yield diverse pedagogical implications. On a pedagogical-practical level, the rubric

designed for this study can be fruitful for teachers and researchers. The rubric can prove useful for practitioners to assess the three dimensions in various educational contexts and disciplines by providing clear and structured criteria to evaluate students' skills in two CDFs and using sources, thereby enabling more detailed and targeted feedback. In addition, our research has contributed to a broader view of writing development by considering functional-structural aspects of disciplinary literacy and academic language, and suggesting which CDF patterns change across secondary education. This research, in combination with the studies by Garro Larrañaga et al. (2024) and Gerns (2023a, 2023b), has helped in the identification of complex elements in producing each of the CDFs, such as the justification of the criteria on which the comparisons are based, or using explicit rebuttals. Following previous studies suggesting that CDFs can –and must– be explicitly taught, our findings can inform the design of pedagogical practices, tasks, assessment and scaffolding strategies to foster students' mastery of disciplinary literacies. For example, scaffolding strategies that explicitly raise student awareness of the most complex elements (e.g., comparative criteria, counterarguments) using sentence starters or graphic organisers could be derived from this study.

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## APPENDIX 1

Year pairwise post-hoc comparisons per L1 profile group (contrast estimate). Significant differences are flagged (\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ )

### L1 Basque learners

|        | D1_ST            | D1_R             | D1_CR            | D1_LA            | D2_CI            | D2_CC            | D2_CS            | D2_LC            | D3_UC            | D3_DT            | D3_O            |
|--------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|
| Y7-Y8  | -0.1429          | -0.3433          | -0.156           | <b>-0.5142*</b>  | <b>-0.3502*</b>  | -0.2427          | -0.2979          | -0.2408          | -0.2478          | -0.3202          | -0.2768         |
| Y7-Y9  | -0.2772          | <b>-0.4134*</b>  | -0.351           | <b>-0.764***</b> | <b>-0.552***</b> | <b>-0.773***</b> | <b>-0.776***</b> | <b>-0.548**</b>  | -0.3161          | <b>-0.565**</b>  | -0.3493         |
| Y7-Y10 | <b>-0.693***</b> | <b>-0.828***</b> | <b>-0.689***</b> | <b>-1.323***</b> | <b>-0.857***</b> | <b>-0.884***</b> | <b>1.180***</b>  | <b>-0.954***</b> | <b>-0.702***</b> | <b>1.153***</b>  | <b>-0.5351*</b> |
| Y8-Y9  | -0.1343          | -0.0701          | -0.1949          | -0.2504          | -0.2             | <b>-0.531**</b>  | -0.4782          | -0.3075          | -0.0683          | -0.2448          | -0.0726         |
| Y8-Y10 | <b>-0.550**</b>  | <b>-0.4851*</b>  | <b>-0.5331*</b>  | <b>-0.809***</b> | <b>-0.506**</b>  | <b>-0.640***</b> | <b>-0.883***</b> | <b>-0.714***</b> | <b>-0.4543*</b>  | <b>-0.832***</b> | -0.2583         |
| Y9-Y10 | -0.4164          | -0.415           | -0.3382          | <b>-0.5585*</b>  | -0.3068          | -0.1104          | -0.4045          | -0.4059          | -0.3861          | <b>-0.588**</b>  | -0.1857         |

### L1 Basque and Spanish learners

|        | D1_ST   | D1_R            | D1_CR   | D1_LA            | D2_CI            | D2_CC            | D2_CS           | D2_LC           | D3_UC           | D3_DT            | D3_O            |
|--------|---------|-----------------|---------|------------------|------------------|------------------|-----------------|-----------------|-----------------|------------------|-----------------|
| Y7-Y8  | -0.1209 | -0.2119         | -0.1431 | -0.197           | -0.1147          | -0.1116          | -0.1434         | -0.4203         | -0.1826         | -0.051           | -0.4549         |
| Y7-Y9  | -0.0603 | -0.5983         | -0.5214 | -0.681           | <b>-0.781**</b>  | -0.6759          | <b>-0.8493*</b> | -0.467          | -0.4087         | -0.5344          | -0.0303         |
| Y7-Y10 | -0.3896 | <b>-0.881**</b> | -0.6238 | <b>-1.116***</b> | <b>-0.795***</b> | <b>1.028***</b>  | <b>-0.9483*</b> | <b>-0.847**</b> | <b>-0.6382*</b> | <b>-0.954***</b> | -0.4901         |
| Y8-Y9  | -0.0607 | -0.3864         | -0.3783 | -0.484           | <b>-0.665**</b>  | -0.5643          | <b>-0.993**</b> | -0.0467         | -0.2262         | -0.4834          | -0.4246         |
| Y8-Y10 | -0.5105 | <b>-0.669*</b>  | -0.4807 | <b>-0.919***</b> | <b>-0.681**</b>  | <b>-0.917***</b> | <b>1.092***</b> | -0.4267         | -0.4557         | <b>-0.903***</b> | <b>-0.945**</b> |
| Y9-Y10 | -0.4498 | -0.283          | -0.1024 | -0.4353          | -0.0151          | -0.3524          | -0.0991         | -0.38           | -0.2295         | -0.42            | -0.5204         |

### L1 Spanish learners

|        | D1_ST            | D1_R             | D1_CR            | D1_LA            | D2_CI            | D2_CC            | D2_CS            | D2_LC            | D3_UC            | D3_DT            | D3_O             |
|--------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Y7-Y8  | <b>-0.395**</b>  | <b>-0.427***</b> | <b>-0.3504*</b>  | <b>-0.56***</b>  | <b>-0.431***</b> | <b>-0.389**</b>  | -0.3243          | -0.5169          | <b>-0.2893*</b>  | <b>-0.36**</b>   | -0.2652          |
| Y7-Y9  | <b>-0.525***</b> | <b>-0.766***</b> | <b>-0.709***</b> | <b>-1.167***</b> | <b>-0.619***</b> | <b>-0.669***</b> | <b>-0.673***</b> | <b>-0.859***</b> | <b>-0.576***</b> | <b>-0.754***</b> | <b>-0.3822*</b>  |
| Y7-Y10 | <b>-0.77***</b>  | <b>-0.744***</b> | <b>-0.809***</b> | <b>-1.198***</b> | <b>-0.703***</b> | <b>-0.898***</b> | <b>-0.476**</b>  | <b>-0.938***</b> | <b>-0.484***</b> | <b>-0.697***</b> | <b>-0.314***</b> |
| Y8-Y9  | -0.1296          | <b>-0.339**</b>  | <b>-0.359*</b>   | <b>-0.608***</b> | -0.1872          | <b>-0.2807*</b>  | <b>-0.3493*</b>  | <b>-0.343**</b>  | <b>-0.2864*</b>  | <b>-0.394***</b> | -0.117           |
| Y8-Y10 | <b>-0.375*</b>   | <b>-0.3171*</b>  | <b>-0.458**</b>  | <b>-0.638***</b> | <b>-0.2726*</b>  | <b>-0.511***</b> | -0.1519          | <b>-0.421***</b> | -0.1947          | <b>-0.337*</b>   | -0.0484          |
| Y9-Y10 | -0.2454          | -0.0218          | -0.0996          | -0.0307          | -0.0854          | -0.2295          | 0.1974           | -0.0788          | -0.0917          | -0.0571          | -0.0686          |

## APPENDIX 2

*Year 7 and Year 10 student text examples, original and translation to English. Errors in the original texts have been maintained, but they have been corrected in English.*

| Year 7 example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Year 10 example                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Oilaskoa kaloria eta koipe gutxiago ditu txokolateak baino, txokolatea 57 g azukre ditu eta oilaskoa oso gutxi; 0,46 g.</p> <p>Oilaskoa merkea eta elikagarriagoa da, txokolatea baino, bestalde txokolatea ez da hain elikagarria, baina egiteko prozesuan ez da animalirik behar eta horrela natura eta mundua gehiago zaintzen dugu, gainera umorean eragiten du, baita ere kolesterola kontrolatzeko lagungarria da.</p> <p>Adibidez oilaskoa nerbioen eta digestio sistemaren funtzionamenduan laguntzen du, gainera energia ematen du, proteinetan altua delako. Txokolatea postreetan bakarrik erabili ahal da, eta oilaskoa askoz erabilgarriagoa da, nahiz eta hain goxoa ez izatea txokolatea bezala.</p> <p>Nire ustez oilaskoa txokolatea baino osasungarriagoa eta erabilgarriagoa da, dietak egiteko, pisua jeisteko, orekatuago jateko...</p> | <p>Nire uste oilaskoa txokolatea baino osasuntsuagoa da alde guztietatik. Koipeak, azukre eta kaltzioa neurri hobean baitituelako. Koipea 19 g ditu, azukrea 0,46 g eta azkenik kaltzioa 11 mg. Hortaz aparte, oilaskoak proteina oso lagungarriak ematen dizkigu eta esan daiteke proteina gehien ematen dizkigun janaria dela.</p> <p>Alde batetik, dietan laguntzen du, oilaskoa sarritan sartzen da dietetan, onura asko ekartzen ditu eta. Nerbio eta digestio aparatuan laguntzen du eta kirola egiterako orduan energia ematen du. Baina, ez bada guztiz ondo sukaldatzen eta gordinik jaten bada, intoxikatzeko probabilitatea oso handia izango da. Arrazoi horiek, okela osasuntsuagoa dela pentsatzera eramaten dit, gainera merkea eta oso elikagarria da eta oso erraz lortzen da elikagai hau. Txokolateak, berriz, azukre gehiegi dauka, 29 g hain zuzen ere eta horrek denbora gutxiko gizentasuna dakar, sarritan jaten bada. Honek ez ditu oilaskoak bezhainbeste kaloria baino, zerbait badauka, 7,4 g gutxi gora behera. Hortaz aparte, esaten da memorian laguntzen duela baina ez nago horrekin guztiz ados, ez dut uste txokolate zati bat janda memoria hobetuko dizunik.</p> <p>Txokolateak kaloria asko ditu eta hori gizentasunaren beste arazoetako bat da. Nahiz eta egiteko prozesuan animalirik ez hil eta gutxi kutsatu ez da gehiegi jan behar.</p> |
| <p>Chicken has fewer calories and less fat than chocolate, as chocolate contains 57g of sugar, while chicken has very little; 0.46g.</p> <p>Chicken is cheaper and more nutritious than chocolate. On the other hand, chocolate is not as nutritious, but its production process does not require animals, which helps us take better care of nature and the planet. Additionally, chocolate affects mood and can also help control cholesterol.</p> <p>For example, chicken aids in the functioning of the nervous and digestive systems and provides energy because it is high in protein. Chocolate can only be used in desserts, while chicken is much more versatile, even though it is not as sweet as chocolate.</p> <p>In my opinion, chicken is healthier and more useful than chocolate for diets, losing weight, and eating more balanced meals.</p> | <p>In my opinion, chicken is healthier than chocolate in every way because it has a better balance of fats, sugar, and calcium. Chicken contains 19g of fat, 0.46g of sugar, and 11mg of calcium. Additionally, chicken provides very beneficial proteins, and it can be said that it is one of the foods that provides the most protein.</p> <p>On one hand, chicken helps with diets, as it is often included in diet plans, bringing many benefits. It aids the nervous and digestive systems and provides energy when exercising. However, if it is not cooked properly and eaten raw, the risk of intoxication is very high. These reasons lead me to think that chicken is a healthier meat. Moreover, it is cheap, highly nutritious, and very easy to obtain. Chocolate, on the other hand, contains too much sugar—29g to be exact—which can lead to short-term obesity if consumed frequently. While it doesn't have as many calories as chicken, it still contains around 7.4g. Additionally, it is said to help with memory, but I don't entirely agree with that; I don't believe eating a piece of chocolate will improve your memory.</p> <p>Chocolate has a lot of calories, which is another issue related to obesity. Even though its production process doesn't involve killing animals and it pollutes less, it should not be consumed in excess.</p>            |