A Corpus-Based Analysis of Cohesion in L2 Writing
by Undergraduates in Ecuador

Submitted by José Segundo Lema Alarcón to the
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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: ……..

Abstract

In finding out the nature of cohesion in L2 writing, the present study set out to address three research questions: (1) What types of cohesion relations occur in L2 writing at the sentence, paragraph, and whole-text levels? (2) What is the relationship between lexico-grammatical cohesion features and teachers' judgements of writing quality? (3) Do expectations of cohesion suggested by the CEFR match what is found in student writing?

To answer those questions, a corpus of 240 essays and 240 emails from college-level students learning English as a foreign language in Ecuador enabled the analysis of cohesion. Each text included the scores, or teachers' judgements of writing quality aligned to the upper-intermediate level (or B2) as proposed by the Common European Framework of Reference for learning, teaching, and assessing English as a foreign language.

Lexical and grammatical items used by L2 students to build relationships of meaning in sentences, paragraphs, and the entire text were considered to analyse cohesion in L2 writing. Utilising Natural Language Processing tools (e.g., TAACO, TextInspector, NVivo), the analysis focused on determining which cohesion features (e.g., word repetition/overlap, semantical similarity, connective words) predicted the teachers' judgements of writing quality in the collected essays and emails.

The findings indicate that L2 writing is characterised by word overlap and synonyms occurring at the paragraph level and, to a lesser degree, cohesion between sentences and the entire text (e.g., connective words). Whilst these cohesion features positively and negatively predicted the teachers' scores, a cautious interpretation of these findings is required, as many other factors beyond cohesion features must have also influenced the allocation of scores in L2 writing.

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Introduction

1.0 Overview

This thesis investigates the use of cohesion in written texts composed by undergraduates learning English as a foreign language (EFL) in Ecuador. Cohesion and coherence are two linguistic elements included in the Common European Framework of References for Languages (CEFR) developed by the Council of Europe (2001, 2018) to guide EFL instruction in Ecuadorean schools. However, of the four macro language skills used to communicate in English, there is evidence that writing is the most challenging skill to acquire. Defining the features of a cohesive and coherent written text is problematic. Teachers and students seem to be affected when the specifications for writing are open to various interpretations, and the guidelines are not adequately aligned with the instructional procedures, teaching materials and international standardised examinations.

1.1 Understanding Mastery of Cohesion and Coherence

In order to provide high-quality English language learning to a growing number of students, the Ecuadorean Ministry of Education formally aligned its curriculum to standards set by the Council of Europe (2001). The latest reform states that:

> ‘‘Linguistic functions will be framed within the international standards of the CEFR, guided by and assessed according to the “Can-Do” statements associated with each proficiency level.” (Ministerio de Educación del Ecuador, 2016a, p. 4).

However, while the linguistic functions identified in the CEFR international standards are aimed to guide English language instruction, aligning CEFR proficiency levels (e.g., basic: A1-A2; intermediate: B1-B2; and advanced: C1-C2) to the teaching, learning, and assessing of writing become a challenge for teachers and students (Bakar, 2020).

That is particularly so when statistical data on student achievement in international English proficiency tests indicate that Ecuadorean students’ writing performance is not strong and has not improved since the introduction of the CEFR standards. Recently, mixed results were found in various reports (e.g., Cambridge Assessment English, British Council, and the EF English Proficiency Index).

These results support the notion that Ecuadorean students experience English writing difficulties and may suggest that language educators lack confidence in their ability to teach and assess writing following the CEFR standards.

For example, in 2012, in Ecuador—an area where recruiting well-trained EFL teachers is challenging—educational authorities assessed the language abilities of four thousand English teachers. Using the Test of English as a Foreign Language (TOEFL) exam, authorities found that only 2% of educators achieved the B2 level (upper-intermediate, CEFR), complicating efforts to certify secondary students as intermediate (B1 level) in all Ecuadorean public schools (see Kuhlman & Serrano, 2017).

In addition, although the Ministry of Education has implemented various measures to help students and teachers improve their English language abilities by upgrading the curriculum, increasing in-service training, and providing free textbooks, to this point, writing of quality for most language students seems unattainable (Sevy-Biloon et al., 2020).

In my own professional experience as an EFL teacher in Ecuador, I found that students often struggle with cohesion and coherence. These pragmatic and discourse elements of communicative competence (i.e., discourse competence), recognised to some degree in the CEFR standards, seem to influence texts and lead to problems in the development of students writing.

Some issues include establishing whether novice and more proficient students use cohesion in various sections of their texts and examining whether the inclusion or absence of cohesion clues in texts leads to more coherent and higher writing quality. EFL writers tend to reuse cohesive words in different textual types and use cohesive devices common to the Spanish language with different uses and meanings in the English language (González Torres, 2018).

Cohesion and coherence seem to influence the writing skills of both beginners and more advanced language students. L2 students with low language proficiency seem to struggle in selecting cohesive words (e.g., and, but, because) at the local textual level (e.g., within and between sentences). More proficient students have difficulty selecting cohesion clues at the global level (e.g., connectors that link paragraphs) and selecting cohesive features to glue the whole text together. Similarly, because teachers will judge whether students'

compositions are coherent and of good quality, they may find some student selections of cohesion unfitting. The resulting products (including grammar and vocabulary in connected sentences and paragraphs) often fail to achieve the intended meaning (e.g., Abata Checa, 2021).

Another common issue in EFL writing is the exploitation of frequent cohesive devices across different text types. The effect of using specific cohesive words for different topics and various written tasks is commonly overlooked by EFL students. While L2 writers tend to overuse basic and more frequent connectors to link sentences and paragraphs, they too frequently use the same connectors for other genres that may require distinct types of cohesive devices. For example, rather than switching to a variety of connectives (e.g., moreover, although, since), L2 writers tend to use highly frequent ones to link ideas in academic essays (e.g., and, but, because).

One final issue observed in EFL writing is the use of cohesive devices common in the Spanish language (L1) but maybe inappropriate in English writing. Although cohesive connectors in L1 can have English equivalents, using L1 to match its counterpart requires further knowledge of usage and appropriateness. For instance, while some connectors such as ‘for example’ (‘por ejemplo’ in Spanish) can be translated and work similarly in both languages, other cohesive devices are used differently in English and maybe confusing for Spanish-speaking students. Such confusions may include using the connective words ‘like’ instead of ‘such as’; ‘actually’ instead of ‘currently’; ‘since’ instead of ‘because’ (González Torres, 2018).

Moreover, while cohesion and coherence elements are mentioned in the CEFR guidelines for assessing EFL texts at various proficiency levels, the challenges mentioned earlier become trickier when teachers are required to align writing instruction with insufficiently specific Can-Do benchmarks.

In that respect, the decision by the Ministry of Education to align the EFL curriculum in Ecuador to the linguistic functions framed by the CEFR seems plausible. However, the CEFR scales (e.g., A, B, and C) fall short of fully describing the cohesion required for writers at various levels of language attainment. The cohesion devices required for different text types and whether the inclusion or not of cohesion clues (e.g., connective words) which may lead to

better writing are absent in the standards. In short, the CEFR guidelines do not adequately explain the use of cohesion in the production and assessment of L2 writing.

The Council of Europe introduced an update to the CEFR developed in 2001. The 2018 CEFR companion volume includes new descriptors (Council of Europe, 2018). For example, while the original guidelines hardly mention guidelines on cohesion and coherence, the latest volume furthers the standards to be reached at various levels of L2 attainment.

In addition, the CEFR specifies the text types to be produced across the levels. At the A2 level, for example, L2 students may be able to provide answers to an email, a postcard, or a note. However, the writing cohesion guidelines are treated as if different cohesion elements were equal in their usage and subsequent assessment.

The CEFR guidelines avoid suggesting whether connective words should be deemed the central dimension of writing cohesion and coherence, nor do they indicate whether other cohesion elements should be included.

The writing standards of the CEFR scales barely distinguish between cohesion and coherence. In fact, cohesion and coherence are treated as a blended notion in the CEFR guidelines set out by the Council of Europe (2018).

> "Coherence and cohesion refer to the way in which the separate elements of a text are interwoven into a coherent whole by exploiting linguistic devices such as referencing, substitution, ellipsis and other forms of textual cohesion, plus logical and temporal connectors and other forms of discourse markers. Both cohesion and coherence operate at the level of the sentence/utterance and at the level of the complete text. Key concepts operationalized in the scale include the following:
> - linking words or elements, mainly with logical and temporal connectors
> - using paragraphs to emphasise text structure varying the types of cohesive devices used, with fewer 'clunky' connectors (C levels)" (p. 142).

Discerning this combined notion may be challenging for course planners, materials designers, teachers, and L2 students. Academics interested in the study of cohesion and coherence have primarily suggested that the two notions are connected but different. While cohesion may be related to the selection of textual clues by the writer to help the reader follow ideas in a text, coherence is more related to the understanding derived from the text by the reader. However,

coherence is based on a range of factors, including textual features and reading ability (e.g., McNamara, et al., 1996; McNamara & Kintsch, 1996).

Thus, there is no clear distinction between the use of cohesion and coherence in the CEFR scales, and little explanation of how they differ in the actual teaching and assessment of EFL writing is presented in the CEFR standards.

Developing a more fluent and well-structured description of how the two concepts play out in students' writing is a further challenge for the English language teaching (ELT) community in Ecuador.

In facing these challenges, the present thesis focuses on analysing cohesion in compositions graded by EFL teachers. Mainly, it aims to find out the impact of cohesion features in different parts of a text (i.e., local, global, overall) and the extent of cohesion features influencing the teachers' judgements of textual coherence and writing quality.

It is expected that the findings of this thesis may help the ELT community better define, describe, and categorise the standards for cohesion stated in the CEFR scales, Likewise, this thesis may provide better directions for probing whether EFL students have learned and acquired the linguistic features suggested by the CEFR standards.

Finally, a greater understanding of students' actual mastery of writing cohesion and coherence and a better comprehension of the two concepts may contribute to ongoing debates. More importantly, it may help teachers develop greater confidence in teaching writing in a variety of contexts (e.g., writing for academic and non-academic purposes).

1.2 Statement of the Thesis

As a result of the current situation, this thesis sought to analyse the lexico-grammatical resources used by L2 learners to build meaning relations in their writing. To achieve that goal, it conducted a corpus-based study of written texts that included teachers' judgements of writing quality.

Focusing on cohesion features used by undergraduate writers studying English at the B2 level as suggested by the CEFR standards for L2 instruction, the general aim was to determine the nature of cohesion in L2 writing and whether

cohesion features occurring in text segments (e.g., at the sentence, paragraph, or entire text levels) showed a relationship with teachers' scores.

Mainly, this study aimed to find empirical evidence that enables answering the proposed research questions presented in Figure 1.1.

Primary Research Question:

What is the nature of cohesion in second language writing by undergraduates in Ecuador?

Subsidiary Research Questions:

Research Question One (RQ1). What types of cohesion relations occur in L2 writing at the sentence, paragraph, and whole-text levels?

Research Question Two (RQ2). What is the relationship between cohesion features (e.g., grammatical and lexical) and teachers' judgements of writing quality?

Research Question Three (RQ3). Do expectations of cohesion suggested by the CEFR match what is found in student writing?

Figure 1.1 – Primary and Subsidiary Research Questions

Background of the Study

2.0 Introduction

This chapter presents an overview of English language teaching in Ecuador. The chapter focuses on instructional issues by describing the alignment of L2 instruction with the CEFR standards in schools, the role of teachers, the teaching pedagogy, the relevance of textbooks and examinations, as well as specific issues such as cohesion and coherence in L2 writing.

2.1 The Alignment of EFL Courses to CEFR Standards

Educational policymakers and institutions in Latin America have chosen to align the curricula to the CEFR as the guiding document for teaching, learning, and assessing the English language to international standards (Banfi, 2017).

An illustration of this is the alignment of Ecuadorean public school curricula to standards and level descriptors of Can-Do statements benchmarked to the CEFR scales in 2016. However, although the CEFR document was not intended to be a standardisation instrument, educational bodies (e.g., the Ministry of Education in Ecuador) aim to validate L2 instruction to international standards (Council of Europe, 2001, 2018; Ministerio de Educación del Ecuador, 2016a).

Level	School Year	Students' Age
A1	At the end of primary education	13 – 14
A2	In the middle of secondary education	15 – 16
B1	At the end of secondary education	17 – 18

Table 2.1 – English Level Learning Goals in Secondary Education

Hence, local officials have sought that primary and secondary students reach the levels suggested by the CEFR standards as shown in Table 2.1 above.

In that respect, the Can-Do statements detailed in the CEFR global scales for Basic Users (A1 – A2 levels), Independent Users (B1 – B2 levels), and Proficient Users (C1 – C2) are deemed relevant by educational policymakers. For example, while formulating the English language learning standards (ELLS) for primary and

secondary schools, curriculum planners in Ecuador describe the ELLS, as "outcomes students are expected to achieve at the end of a proficiency level in terms of knowledge and skills gained throughout the process" (Ministerio de Educación, 2016a, p. 8).

Educational officials also emphasise that the ELLS are based on the CEFR standards because "they provide a common basis for the explicit description of objectives, content, and methods", (Ministerio de Educación, 2016a, p. 8).

Like in the organisation of EFL courses in secondary education, L2 instruction at tertiary level education adheres to language descriptors stated in the CEFR. For example, the Catholic University of Ecuador and the Armed Forces University ESPE offer general English courses that aim at meeting the CEFR language goals at the basic, intermediate, and advanced levels to all undergraduates as a prerequisite for graduation.

However, although educational institutions have adopted the CEFR for course planning, teaching, and learning in EFL contexts, the evidence suggests a mismatch between L2 instruction and assessment results. Reports on L2 attainment indicate that the assessment criteria and learning objectives aligned with CEFR standards have produced mixed results.

Specifically, on productive skills (e.g., speaking and writing), the results indicate that the learning objectives stated in the Can-Do statements correspond primarily to the basic levels of L2 attainment (A1 and A2). This fact seems to be the norm in the region; however, reports have situated Ecuador at the bottom of the standardised test results in recent years (The British Council, 2015; EF English Proficiency Index, 2020).

2.2 School Standards for EFL Writing

In general, schools subscribe to CEFR specifications in EFL writing that explain what learners can do for receptive, interactive, and productive communication activities at various proficiency levels. For example, the CEFR specifications for overall written production state what speakers can do at each level of L2 proficiency. Table 2.2 shows these Can-Do statements and levels.

Level	L2 Speakers
C2	"Can write clear, smoothly flowing, complex texts in an appropriate and effective style and a logical structure which helps the reader to find significant points."
C1	"Can write clear, well-structured texts of complex subjects, underlining the relevant salient issues, expanding and supporting points of view at some length with subsidiary points, reasons and relevant examples, and rounding off with an appropriate conclusion." "Can employ the structure and conventions of a variety of written genres, varying the tone, style and register according to the addressee, text type and theme."
B2	"Can write clear, detailed texts on a variety of subjects related to his/her field of interest, synthesising and evaluating information and arguments from a number of sources."
B1	"Can write straightforward connected texts on a range of familiar subjects within his/her field of interest, by linking a series of shorter discrete elements into a linear sequence."
A2	"Students can write a series of simple phrases and sentences linked with simple connectors such as and, but, and because."
A1	"Can give information in writing about matters of personal relevance (e.g., likes and dislikes, family, pets) using simple words and basic expressions." "Can write simple isolated phrases and sentences." (Council of Europe, 2018, p75).

Table 2.2 – Can-Do Statements and Levels for L2 Writing

In addition, while schools in Ecuador adhere to the CEFR standards, ministry officials have also designed and developed performance goals for L2 writing instruction. Can-Do statements for L2 writing to be followed by teachers and students in primary and secondary schools are aligned to CEFR levels. For example, such writing guidelines state that L2 learners who reach the A1 level can:

> "Write a short, simple paragraph to describe yourself or other people, animals, places, and things with limited support; write a variety of short simple text types, commonly used in print and online, with appropriate language and layout; write a simple narrative with linking words on familiar subjects about everyday activities." (Ministerio de Educación, 2016a, p. 24).

In addition, by the middle of secondary education, students who reach the A2 level:

> "Can describe feelings or opinions in writing and effectively influence an audience. (e.g., persuade, negotiate, argue, etc.) as well as recognize that

> different types of writing require different language, formatting, and vocabulary. (e.g., a recipe, a letter, etc.) (Ministerio de Educación, 2016a, pp. 55-56).

In their final year of secondary education, students who should reach the B1 can:

> "Produce emails and blog posts describing personal experiences and feelings as in using a variety of oral, print, and electronic forms for writing to others or for writing for self, applying the conventions of social writing. (e.g., notes, invitations, emails, blog entries and comments, notes to self, etc.)" (Ministerio de Educación, 2016b, p. 35).

Similarly, the English language is an additional academic requirement for most undergraduates in Ecuador. For example, at the tertiary level, students can either retake the basic levels (e.g., A2 and B1) general English courses or register to study the last mandatory English level (e.g., B2 or upper-intermediate). By taking L2 courses, undergraduates may be able to cope with academic-related materials and situations presented in the English language during university (e.g., reading academic articles, attending conferences, and writing different types of texts in English).

To this end, most schools have adopted standardised formats to assess L2 competency. For instance, school planners and teachers use rubrics or criteria lists to decide whether the expected written standards have been met.

In that respect, L2 exam providers (e.g., Cambridge English Qualifications, the International English language Testing System, Pearson English Language Tests) outline the objectives, protocols, and criteria for assessing writing at a specific proficiency level. For example, the B2 First for Schools Handbook for Teachers (Cambridge Assessment English, 2021) provides instructions for assessing writing at the upper-intermediate level:

> "In Part 1, the task will be in the form of an essay question with prompts. The range of functions tested will include agreeing or disagreeing with a statement, giving opinions on a question, giving information or explanations, comparing and contrasting ideas and opinions, exemplifying, giving reasons and drawing conclusions." (p. 28).

2.3 The Role of Teachers

Once institutions have decided to embark on the CEFR standards to guide EFL instruction, language educators play a crucial role in materialising those benchmarks (e.g., A1 – B2 levels). Understanding and successfully implementing each specification (i.e., Can-Do statements) in the L2 classroom involves the

inclusion of extra factors (e.g., teacher's experience and expertise, institutional support) (Richards, 2001).

Teachers pivot between the theoretical understanding of Can-Do statements and the implementation of those standards in the L2 classroom. L2 educators can take advantage of their knowledge and experience by ensuring that teaching materials and assessment protocols align with the language specifications for each level of L2 attainment (e.g., basic, intermediate, advanced).

In order to support current L2 teachers, Ecuadorean educational institutions offer in-service training (e.g., teacher training methods and approaches), test preparation (e.g., Cambridge exams: A2 Key, B1 Preliminary, B2 First), and encourage teachers to obtain a post-graduate degree (e.g., Masters' degree in teaching English as a foreign language).

However, although educational authorities have deemed L2 instruction of quality as their priority, the school system in Ecuador faces a shortage of qualified EFL teachers. That is, teachers who are competent in the target language along with sound pedagogical performance are in short supply (The British Council, 2015).

These issues have implications for hiring new teachers and the training of in-service language educators. New teachers are expected to comply with institutional employment requirements. For example, teachers are now expected to possess a post-graduate degree in English language teaching (e.g., MA in TESOL) and international certifications that prove teachers' L2 proficiency such as the ones offered by Cambridge English Qualifications (e.g., A2 Key, B1 Preliminary, B2 First).

However, language certifications issued by independent institutions (e.g., Cambridge Assessment English, EF Education First, Educational Testing Service) that certify teachers' language knowledge and communicative competence are not fully available for most teachers. Due to their costs and the lack of a policy that encourages L2 teachers to take more advanced language proficiency tests, most educators do not consider it necessary to improve their L2 abilities at higher levels of proficiency.

Researchers and institutions interested in the development of L2 in the region all agree that Ecuadorean teachers' language competency needs to improve (The British Council, 2015; EF EPI, 2020; Sevy-Biloon, 2017;).

Richards (2001) comments that "good teachers can often compensate for deficiencies in the curriculum, the materials, or the resources they make use of in their teaching" (p. 9). However, low results mirroring other countries in the region suggest that the language proficiency factor may significantly impact L2 instruction.

These issues may seem obvious. They likely explain the poor English language assessment outcomes in each macro-language skill (i.e., reading, listening, speaking, and writing). Particularly, writing low results may not only be explained by the lack of confidence of educators in L2, but also by other factors. Such factors hindering L2 writing development may be linked to the low status of writing in the L2 language learning process and its peripheral position in the curriculum, instruction, and assessment materials (Reichelt, 2013; Richards, 2015). For example, suppose more emphasis is given to language form (e.g., grammar drilling) and oral skills (e.g., speaking and listening) in the L2 curriculum, instructional materials, and testing. In that case, understandably, L2 educators may eschew written communication skills.

Additionally, the discussion aimed to develop teachers' content knowledge in writing, that is, what teachers know about writing and teaching writing skills, seems to be overlooked (McCutchen, 1986; Richards, 2001). Such critical discussions may include: (a) approaches for the teaching of writing (e.g., writing as a product and a process); (b) distinguishing between writing for academic and non-academic audiences; (c) a working knowledge of the English writing system and how it may differ from the students' first language; (d) understanding of the text types and genres required at different stages of L2 development (e.g., at primary, secondary, and tertiary educational levels); and (e) discerning the difference between L2 writing assessment protocols and tasks adopted in local schools and by high-stake international examinations developed mainly by the Cambridge University Press and Assessment (Coombe et al., 2012).

Hence, EFL teachers in Ecuador face challenges in finding appropriate writing pedagogical models to help students develop writing skills. One challenge relates

to teaching large groups, which may hinder teachers' abilities to articulate more personalised language explanations and feedback about writing. Without proper training, L2 educators seem to feel overwhelmed. As reports suggest, that situation has long been commonplace in most public schools in Ecuador (e.g., Coloma-Escobar, 2021; Sevy-Biloon et al., 2020).

In addition, EFL teachers must develop instructional strategies to handle factors that seem to inhibit L2 writing development as pointed out by L2 experts and researchers (e.g., Canagarajah, 2002; Muamaroh et al., 2020; Reichelt et al., 2012; Richards, 2015).

Such factors that affect both teachers and students may be linked to low confidence when writing in an L2 (Maloney, 2022); limited knowledge of various text types and genres (Ken Hyland, 2004; Tardy, 2012; Wennerstrom, 2003), insufficient mastery of linguistic elements, rules and new conventions required to write in the target language (Ken Hyland, 2003; Jones & Hafner, 2012), inadequate feedback (K. Hyland & Hyland, 2019) as well as dealing with limited practice opportunities for developing creative and academic writing (Sevy-Biloon et al., 2020).

As mentioned earlier, to explain how texts are put together (e.g., using accurate grammar, vocabulary, and connective words), L2 teachers must have adequate language proficiency (i.e., certified A2, B1, or C1 proficiency levels) to explain the English writing system (Medgyes, 2001; Richards, 2015).

Adequate proficiency in English may even enable teachers to mirror the text types required at various CEFR levels. In using models, however, teachers with low language proficiency may struggle to provide high-quality written models required at higher levels of L2 proficiency (Barkaoui, 2007).

Similarly, modelling various text types and genres in English may require teachers to advance their disciplinary and pedagogical content knowledge (Richards, 2011, 2015). A case in point is modelling cohesion and coherence in written texts. In explaining cohesion strategies, teachers may help students better comprehend how information is organised, how ideas are chained within sentences and between paragraphs, and how cohesion helps glue the whole text together (Hinkel, 2001).

Those pragmatic elements of text structure and cohesion, which may be essential for L2 teachers to determine the quality of students' writing, have long been of interest to scholars (e.g., Alotaibi, 2015; Crossley & McNamara, 2011c; Jafarpur, 1991; McNamara et al., 2014; Witte & Faigley, 1981; Yang & Sun, 2012).

2.3.1 Teachers' Judgements of Quality and L2 Writing.

In grading written assignments and exams composed by L2 students at various levels of L2 attainment (e.g., basic: A1/2; intermediate: B1/B2; advanced: C1/C2), Ecuadorean teachers may rely on the assessment criteria suggested by the CEFR guidelines as set out in Table 2.3.

Level	Can-Do Statements
C2	"I can write clear, smoothly flowing text in an appropriate style." "I can write complex letters, reports or articles which present a case with an effective logical structure which helps the recipient to notice and remember significant points." "I can write summaries and reviews of professional or literary works."
C1	"I can express myself in clear, well-structured text, expressing points of view at some length." "I can write detailed expositions of complex subjects in an essay or a report, underlining what I consider to be the salient issues." "I can write different kinds of texts in a style appropriate to the reader in mind."
B2	"I can write clear, detailed text on a wide range of subjects related to my interests." "I can write an essay or report, passing on information or giving reasons in support of or against a particular point of view."
B1	"I can write straightforward connected text on topics which are familiar or of personal interest."
A2	"I can write a series of simple phrases and sentences linked with simple connectors like "and", "but" and "because"."
A1	"I can write simple isolated phrases and sentences." (Council of Europe, 2018, p. 169).

Table 2.3 – Written Production in the CEFR

Additionally, more detailed criteria are included in the CEFR for the assessment of L2 writing. Such criteria involve scaled Can-Do statements focusing on written performance (e.g., overall performance, lexical range, coherence, accuracy, description, and argument). For example, to evaluate coherence and cohesion in L2 writing, the Council of Europe (2018) suggests Can-Do statements for each level of proficiency. See Table 2.4.

Level	Coherence and Cohesion
C2	"Can create coherent and cohesive texts making full and appropriate use of a variety of organisational patterns and a wide range of connectors and other cohesive devices."
C1	"Can produce clear, smoothly flowing, well-structured text, showing controlled use of organisational patterns, connectors and cohesive devices."
B2	"Can use a number of cohesive devices to link his/her sentences into clear, coherent text, though there may be some "jumpiness" in a longer text."
B1	"Can link a series of shorter discrete elements into a connected, linear text."
A2	"Can link groups of words with simple connectors like "and", "but" and because".
A1	"Can link words or groups of words with very basic linear connectors like "and" and "then"." (Council of Europe, 2018, p 173).

Table 2.4 – Coherence and Cohesion in the CEFR

The assessment criteria provide the expectations and guidelines to evaluate the written performance in each CEFR benchmark. Further, in grading compositions, school planners, L2 teachers, and assessment bodies may consider these Can-Do statements to evaluate different dimensions in writing by L2 students. For example, in assessing coherence and cohesion criteria, experienced teachers may consider the appropriateness of including cohesive devices at local, global, and entire text levels.

2.4 The Teaching Pedagogy

The issue of how macro-language skills and knowledge is imparted in the L2 classroom has received considerable critical attention in Ecuador. Past and recent reports suggest that L2 instruction has long been influenced by conventional methods (e.g., Direct and Grammar Translation methods) (e.g., The British Council, 2015; Orosz et al., 2021; Porto, 2016)

However, a growing number of studies also suggest that L2 educators in Ecuador utilise methods that claim to further communicational goals in L2 learning such as Content and Language Integrated Learning, Task-Based Learning, and the Communicative Approach (e.g., Alvarez & Guevara, 2021; Machado-Encalada, 2013; Oviedo Guado & Mena Mayorga, 2021).

Adopting methodologies that emphasise meaningful communication in L2 instruction has been on the agenda of educational officials, curriculum developers in schools, and L2 educators. The Ministry of Education, for example, has provided tailor-made instructional materials (e.g., textbooks, media) for students and organised teaching training to emphasise L2 communicative instructional methodologies (Ministerio de Educación del Ecuador, 2016a).

Hence, school curricula in public and private schools have witnessed the growing adoption of the communicative competence approach to guide L2 instruction. Richards and Schmidt (2013) define the communicative approach by emphasising that "…the goal of language learning is communicative competence, and which seeks to make meaningful communication and language use a focus of all classroom activities" (pp. 98-99). While grammar and vocabulary drilling is appropriate, such activities focus on supporting student communicational engagement, emphasising classroom activities and strategies that exploit students' collaboration (e.g., pair work, group work, and the entire class L2 practice).

Curriculum developers and educators in schools may have also considered following the L2 guidelines suggested by the Ministry of Education, which emphasise communicational goals in L2 instruction. Teaching methods guidelines in the organisation of courses at primary and secondary levels state that:

> Within this approach, the proposal emphasizes the development of the four communicative skills rather than linguistic content learning, because the goal of foreign language learning is not to turn learners into experts in linguistics who can conceptualize and decipher the various components of the language, but rather future citizens who are competent in the use of a second language for oral and written communication (Ministerio de Educación del Ecuador, 2016a, p. 3).

In addition, although research on the influence of methodologies in L2 learning is an ongoing concern within the L2 educational field, empirical studies indicate mixed results in Ecuador (e.g., Banegas et al., 2020; Solís Garcés, 2021; Toro et al., 2019). Research suggests that teachers' prominence on students' oral abilities (i.e., speaking and listening) seems to have influenced the teaching of speaking at the expense of less teaching time on listening, reading and mainly writing. As some reports suggest that teaching methodologies based on

communicative learning strategies seem to indicate that speaking skills are the most preferred by educators in the L2 classroom (e.g., Alvarez & Guevara, 2021; García León, 2019; Moreira Celorio & Bazurto Bravo, 2018).

2.5 Writing in Textbooks

English language writing instruction in Ecuadorean schools has also been influenced by the descriptions of this productive skill present in the learning objectives and learning tasks of commercial textbooks. In the country, most public and private schools use textbooks. Textbooks impact the planning of EFL courses in schools. They provide the language aims, objectives and content for different proficiency levels as suggested by the CEFR standards. Textbooks may also provide the skills addressed, the topics, the time required for each lesson, the number, and the organisation of units, the theoretical framework, as well as the methodology focus. Textbooks even provide the primary basis for the curriculum in most schools (Richards, 1993, 2015).

As a result, textbooks have been considered central in teaching English language skills. Schools, teachers, and students seem to have benefited from using textbooks as pointed out by Richards (2015):

> "The book is, in fact, often treated as the syllabus, and determines the goals and content of teaching, as well as the methods teachers use. For both teachers and learners, the textbook provides a map that lays out the general content of lessons and a sense of structure that gives coherence to individual lessons, as well as to an entire course" (p. 594).

Ecuadorean educational authorities, well aware of this fact, have introduced a set of free textbooks for primary and secondary public schools. The topics and activities suggested in those textbooks seem to address the development of students' L2 skills (e.g., reading, listening, speaking, and writing) (Ministerio de Educación, 2019).

Additionally, the language contained in L2 textbooks seems to adhere to the CEFR specifications. Table 2.5 shows writing task prompts for each CEFR level in textbooks for public schools in Ecuador.

Level	Writing Task Examples
B1	"You are going to write an email to a British teenager to tell him or her what it is like to be a teenager in Ecuador. Choose three topics that you discussed with your group to include in your email. Write 80-90 words." (Ministerio de Educación, 2019, p. 5).
A2	"Imagine you receive an email from a friend, John, about your favorite game or video game. Your friend asks you these questions: a. What is the name of your favorite game or video game? b. Why do you like it? c. Do you play alone, with one other person, or in groups? d. Is it easy to play? e. What are the rules?" (Ministerio de Educación, 2019, p. 27).
A1	"Imagine. An elephant escapes from a zoo and arrives at your school! Don't be scared! Write a description of the elephant for the zookeeper. 1. The elephant's ears are very big. 2. (eyes) 3. (tail) 4. (legs)" (Fifth Grade EGB; Ministerio de Educación, 2019, p. 13).

Table 2.5 – Writing Tasks in Textbooks for Public Schools

Similarly, private language institutes and universities use various commercial materials to teach English at all levels. Table 2.6 shows writing task examples at the B2 and C1 levels from a commercial textbook to be used in more advanced courses.

Level	Writing Task Example
C1	"Imagine that you are interested in learning more about a study program. Write your formal letter to the program director expressing interest and requesting information. Include all five parts of a formal letter." (Passages 2; Richards & Sandy, 2014b, p. 99).
B2	"Brainstorm ideas for a composition about someone who is very creative or who is unique or different in an interesting way. Answer these questions to help you. 1. In what ways is this person special or different? 2. How does this affect his or her life? 3. Would you like to be like this person? Why or why not? C Write a three-paragraph composition based on your ideas." (Passages 1; Richards & Sandy, 2014a, p. 65)

Table 2.6 – Writing Tasks in Commercial Textbooks

However, writing as presented in textbooks becomes the final language product influenced by reading and listening macro skills and complemented by other sub-language skills (e.g., knowledge of grammar and vocabulary, structuring of ideas, and communicative quality).

Unfortunately, writing is presented as the last of the macro skills and is not very significant for most students and teachers. Those facts appear to have had

consequences on how EFL writing is perceived by teachers and students. They may see writing as the least important skill to master and, although complex, not as important as speaking or listening (Fareed et al., 2016; Reichelt et al., 2012; Richards, 2015).

2.6 L2 Writing in Standardised Examinations

International standardised examinations have become popular in assessing English language skills for L2 learners (Cumming, 2009). Along with the syllabus and textbooks, EFL examinations align with the CEFR benchmarks. For example, the Cambridge English tests aim to certify L2s' language abilities at different proficiency levels in school contexts and for individuals interested in obtaining an L2 certification for professional purposes. Cambridge tests, for example, consider the assessment of all four language macro-skills (e.g., reading, listening, speaking, and writing) from basic to more advanced levels of L2 proficiency (e.g., A2, B2, C1). Table 2.7 shows each exam aligned to the CEFR standards.

CEFR Levels		Exam
Proficient User	C2	C2 Proficiency
	C1	C1 Advanced
Independent User	B2	B2 First
	B1	B1 Preliminary
Basic User	A2	A2 Key
	A2	A2 Flyers
	A1	A1 Movers
	A1	Pre-A1 Starters

Table 2.7 – Cambridge English Tests

Relevant to this study, the assessment of writing at the B2 level has been commonly conducted following the guidelines set out by the Cambridge B2 First for Schools exam (English Cambridge Assessment, 2020).

In particular, the B2 First exam for schools has two writings parts. That is, part one requires test-takers to write an essay (a mandatory task), and in part two, students select a text from a choice of three questions (e.g., articles, emails,

letters, reviews, stories). Both parts require students to write 140 to 190 words. The B2 First for Schools handbook for teachers (Cambridge Assessment English, 2021) states the task types and assessment focus for writing at this level of proficiency as shown in Table 2.8.

	Writing Tasks at the B2 Level
Part 1	"The task will be in the form of an essay question with prompts." "The range of functions tested will include agreeing or disagreeing with a statement, giving opinions on a question, giving information or explanations, comparing and contrasting ideas and opinions, exemplifying, giving reasons and drawing conclusions." "Candidates are required to write a discursive essay in grammatically correct English, using a neutral or formal register."
Part 2	"Candidates have a choice of tasks." "The questions are general questions, based on a range of topics, such as health and fitness, sport, music and so on." "The tasks may include any of the following task types: an article, an informal or formal letter or email, a report, a review" (Cambridge Assessment English, Teachers' Handbook, 2021, pp 28-30).

Table 2.8 – Task and Focus for Assessing Writing at the B2 Level

In addition, the Cambridge Assessment English outlines the assessment criteria for writing at the B2 level. To that end, a two-dimensional rubric (i.e., analytical rubrics), that includes various levels of achievement (from 0 to 5) and writing assessment criteria (e.g., content, communicative achievement, organisation, language), is one strategy to assess writing.

Specifically, the writing assessment at the B2 level comprises four criteria or sub-scales aligned to the CEFR standards: content, communicative achievement, organisation, and language. Each sub-scale attempts to determine specific achievements. Meeting such standards includes task fulfilment (e.g., relevance), appropriate style and tone (e.g., conventions), the logical arrangement of ideas (e.g., cohesion), and the range and accuracy of grammar and vocabulary (e.g., everyday and less common vocabulary). (See the detailed writing criteria in Appendix I).

2.7 Cohesion in L2 Writing and the CEFR Standards

In my professional experience as an L2 teacher, cohesion, for example, is one area of particular difficulty that students face when composing coherent texts.

L2 students struggle to understand the relationships of meaning realised by lexical and grammatical cohesion occurring in text segments (e.g., between and within sentences, between paragraphs and the entire text).

For most students, it may be novel to realise that lexico-grammatical items are crucial in building meaningful relationships when composing a text. Lexical cohesion by repetition, for example, may aid students to identify relations of meaning (e.g., word repetition, synonymy) at the sentence and paragraph levels. Similarly, the use of connective words (e.g., and/In addition, but/Although) may aid students to link ideas across the text.

However, teachers unfamiliar with the descriptors of cohesion presented in the CEFR standards (Council of Europe, 2001, 2018) may overlook the Can-Do statements regarding cohesion and coherence. For example, most L2 educators may still be unaware that cohesion descriptors (e.g., ‘and’, ‘but’, and ‘because’) included in the first CEFR version published in 2001, have been expanded in the 2018 CEFR companion volume.

The latest Can-Do statements, for instance, include new specifications for the B2 level:

> “To understand the argumentation in a text, students can exploit various types of connectors (numerical, temporal, and logical) and the role of key paragraphs in the overall organisation. They can extrapolate the meaning of a section of text by taking into account the text as a whole. Students can follow a line of argument or the sequence of events in a story by focusing on common logical connectors (e.g., however, because) and temporal connectors (e.g., after that, beforehand)” (Council of Europe, 2018, p. 67).

Moreover, these updates may be relevant elements for institutions and individuals who have formally (or less formally) adopted the CEFR standards for guiding EFL instruction. And, it is even more critical for EFL teachers directly involved in the implementation of language specifications for EFL courses.

Additionally, the CEFR (Council of Europe, 2018) expands the Can-Do statements across proficiency levels. Cohesion guidelines are stated from basic to more advanced levels as shown in Table 2.9.

Level	Coherence and Cohesion
C2	"Can create coherent and cohesive text making full and appropriate use of a variety of organisational patterns and a wide range of cohesive devices."
C1	"Can produce clear, smoothly flowing, well-structured speech, showing controlled use of organisational patterns, connectors and cohesive devices." "Can produce well-organised, coherent text, using a variety of cohesive devices and organisational patterns."
B2	"Can use a variety of linking words efficiently to mark clearly the relationships between ideas." "Can use a limited number of cohesive devices to link his/her utterances into clear, coherent discourse. Though there may be some 'jumpiness' in a long contribution." "Can produce text that is generally well-organised and coherent, using a range of linking words and cohesive devices." "Can structure longer texts in clear, logical paragraphs." "Can introduce a counter-argument in a simple discursive text (e.g. with 'however')"
B1	"Can link a series of shorter, discrete simple elements into a connected, linear sequence of points." "Can form longer sentences and link them together using a limited number of cohesive devices, e.g., in a story." "Can make simple, logical paragraph breaks in a longer text."
A2	"Can use the most frequently occurring connectors to link simple sentences in order to tell a story or describe something as a simple list of points." "Can link groups of words with simple connectors like 'and, 'but' and 'because'."
A1	"Can link words or groups of words with very basic linear connectors like 'and' or 'then'" (Council of Europe, 2018, p. 142).

Table 2.9 – Coherence and Cohesion Descriptors

Admittedly, it has taken almost two decades for the CEFR developers to address issues of cohesion and coherence. During that time, the EFL field may have struggled with the lack of specifications to help guide the school curriculum, instruction, and assessment.

Teachers may still wonder whether connective words should be the only dimension of writing cohesion and coherence. The proposed standards fail to indicate whether other cohesion elements, such as those mentioned by Halliday and Hasan (1976) on references, substitutions, ellipses, and conjunctions should also be considered in L2 instruction. More relevant, while the CEFR hardly

mentions these types of cohesion, it overlooks the details for standardisation in the different scales.

Finally, teachers may also need to offer students a “rule of thumb” to distinguish the semantic difference between grammatical and lexical cohesion—while grammar cohesion conveys general meanings, vocabulary cohesion expresses more specific and identifiable meanings. Cohesion as a semantic relation cannot be seen detached from other cohesive ties (e.g., personal pronouns, synonyms, grammar tenses). Indeed, Halliday and Hasan (1976) emphasised that “some forms of cohesion are realised through grammar and others through the vocabulary” (p. 6).

Literature Review

3.0 Introduction

This literature review is divided into two sections. In the first part, I attempt to draw attention to the theory around cohesion and the factors that may influence the development of cohesion. The second part reviews the empirical research on cohesion in writing by identifying gaps in the literature on cohesion. Both sections aided to define better the research questions for this thesis.

3.1 Linguistic Perspectives on Cohesion

Linguists such as John Firth, Michael Halliday, and Ruqaiya Hasan furthered the study of language as a network of systems or linguistic sets of options to express meaning in a determined context. Their ideas focused on meaning over decontextualised linguistic forms as the core of learning a language.

Like native English speakers using their language in academic and non-academic contexts, English users from different language backgrounds are also expected to communicate cohesively and coherently. Both categories of language users must apply advanced linguistic capabilities to produce and understand a text. However, any instance of language may be referred to as a text that can be approached for its analysis without considering its context.

Texture, for example, differentiates a text from something that is not a text. Martin (2001) asserts that “texture is a process whereby meaning is channelled into a digestible current of discourse instead of spilling out formlessly in every possible direction” (p. 35). As an example of how texture works, the linguistic elements in excerpt (1) have been altered.

(1) “However, with the support of the innocent foundation and are extremely expensive. 1kg costs well in excess of an average day’s pay. Due to the wet conditions. Most of the time. Apples are easy to come by in Ethiopia. International Development Enterprises (IDE-UK). It tends to be imported from South Africa. For example, limited water supply helping to set up apple farms across Ethiopia. Many people buy them” (The Innocent Foundation, 2009).

In the interpretation of this excerpt, a reader may easily notice the lack of unity and logical arrangement of propositions. Due to the derailment in the ordering of the sentences and incoherent ideas, its meaning is mostly disrupted.

Cohesion, which refers to relations of meaning that occur in text segments, may enable writers and speakers (i.e., producers) to successfully maintain the unity and consistency of spoken and written texts. Texts that readers and listeners (i.e., receivers) will engage in their interpretation (Halliday & Matthiessen, 2013). For example, cohesion features (highlighted in bold, underlined, and italicised) in excerpt (2) show their contribution to the unity of the text.

(2) "**Apples** are hard to come by in **Ethiopia**. Due to the dry conditions and limited water supply, not many people **grow them**. Most of the time, **they** tend to be imported from **South Africa** and are extremely **expensive**. *For example*, 1kg of **apples costs** well in **excess** of an average day's pay. *However*, with the support of the innocent **foundation**, International Development **Enterprises** (IDE-UK) are helping to set up **apple farms** across **Ethiopia**." (The Innocent Foundation, 2009).

The unity of a text may be realised by the semantical relations (i.e., meaning relations that occur between cohesive ties) that occur between sentences present in different segments of a text. Such cohesive ties in the example above include the use of **they them** to refer back to **apples**; the repetition of lexical units **apples**; the use of related vocabulary such as **grow**, **apple farms**, **expensive**, **pay**, **cost**; or the use of phrases or the adverbs *For example* and *however* that may function as discourse organisers.

In addition, the texture of a text involves microstructural and macrostructural processes. The microstructure process mainly involves the structural or grammatical organisation within the clause, and the clause complex is more related to the sentence as shown in the grammatical relations underlined in the text (2) above (e.g., *are hard to*; *due to*…*not many; tend to be; and are; are helping*).

Similarly, according to Halliday and Matthiessen (2013), the macrostructure involves extralinguistic levels such as the social purpose of a text (i.e., genre), the context of a situation and the variety of the language utilised in a text (i.e., register). In other words, the macrostructure of a text acknowledges the "environment in which meanings are being exchanged" (Halliday & Hasan, 1976, p. 9).

The macrostructure of the example above may involve (a) its social purpose or genre (e.g., a corporate blog); (b) its context of situation or register, including the

subject matter or field (e.g., specific information aimed at reaching corporate goals); who is involved or tenor (e.g., business to consumer); and (c) the channel of communication (e.g., written computer-mediated communication).

Once a text is produced, the receiver will use another set of processes to interpret the propositions posed by a writer or speaker in a text. Martin (2001) argues that "texture is one aspect of the study of coherence, which can be thought of as the process whereby a reading position is naturalized by texts for listener/readers" (p. 35).

In a coherent text, its constituents are not only internally cohesive by grammatical and lexical means that relate to its surroundings where they happen, but also a text is coherent with the extra-linguistic process that defines it as a text.

In sum, different processes happen while attempting to describe the texture of a text. Cohesion is one aspect of the analysis of texture (Martin, 2001). Alongside cohesion, the texturing process involves the use of lexical, grammatical, and phonological resources that producers may use to construct distinct types of relations in a text. Likewise, structural relations occur at the clause level as well as macrostructures that assist a text in providing its context. This view is shared by Halliday and Hasan (1976):

> "In the most general terms there are two other components of texture. One is the textual structure that is internal to the sentence: the organization of the sentence and its parts in a way which relates it to its environment. The other is the 'macrostructure' of the text, that establishes it as a text of a particular kind – conversation, narrative, lyric, commercial correspondence and so on." (p. 324).

3.1.1 The Concept of Cohesion

Halliday and Hasan have commonly been associated with research on cohesion (Martin, 1992). According to Halliday (1994), cohesion is "the set of resources for constructing relations in discourse which transcend grammatical structure" (p. 309). Halliday (1985) furthers the explanation of cohesion relations that transcend grammatical structure by distinguishing between structural relations and non-structural cohesion relations.

Adopting a functional sentence perspective, associated with the Prague School that describes how information is distributed in sentences (Luelsdorff, 1994; Richards & Schmidt, 2013), Halliday and Matthiessen (2013) argue that structural

relations on cohesion occur between clauses and complex clauses with the latter more closely related to a sentence. More specifically, structural relations occur in the ordering and progression of information in a text (i.e., thematic structure). For example, notions such as (a) theme and rheme (where the theme is the starting point of a clause and rheme the remainder of the message); (b) given and new information (the inclusion of familiar before new information in a sentence); (c) parallelism (repetition of similar structures); and (d) background-focus (what is known vs what is new information), have been included by academics. They have focused on those notions to explain the role of information structure and their dependencies, the distribution of propositions, and how a text and discourse develop (e.g., Kruijff-Korbayová & Steedman, 2003; Martin, 2001).

However, although structural cohesion may enable language users to construct relations between clauses and within sentences, academics (e.g., Halliday & Hasan, 1976) acknowledged the limitations of grammatical structures in the development of discourse in a text. In fact, they do not reject those non-structural relations that can occur inside the clause complex or sentence, as in the coreference relation that occurs between Paul and he in the sentence (3) below:

(3) If **Paul** works harder, **he** will pass the test.

However, they emphasise that non-structural cohesion relations do occur beyond the sentence level (i.e., between sentences, paragraphs, and the whole text) as shown in example (2) above. Likewise, they state that cohesive relations have "nothing to do with sentence boundaries". They maintain that:

> "…cohesion is a semantic relation between an element in a text and some other element that is crucial to the interpretation of it. This other element is also to be found in the text, but its location in the text is in no way determined by the grammatical structure" (Halliday & Hasan, 1976, p. 8).

Thus, the texture of a text is established by certain kinds of semantic relations. These relations of meaning are structurally unrelated. In other words, their use by a text producer, and subsequent interpretation by a receiver, may be less dependent on structural relationships but mostly "between its individual messages" (Halliday & Hasan, 1985, p. 71).

These co-referential phenomena among words having the same reference within a text may contribute to the cohesion of a text across the boundaries of sentences

(e.g., groups of clauses and sentences). Halliday and Hasan (1976) referred to this linking of elements as the *identity of reference,* in which "one element is interpreted by reference to another" (p. 11).

The semantical relationships or ties of linguistic elements (lexical and grammatical) can be related to cross-referential linking that occurs (backwards and forwards) in a text. C*o-referentiality*, which is at the centre of the semantical relations or cohesive ties, is characterised by the directionality of linguistic elements and between its messages.

Typically, once the presupposed element of a tie is explicitly marked and present in the preceding sentence, an anaphoric relation is created. When the presupposition goes in the opposite direction, and the presupposed element follows, the relation is cataphoric.

Cohesive ties tend to form cohesive chains, in which presupposed items are repeatedly repositioned until the presupposition is ultimately satisfied in the substantial element. Similarly, although exophora is a special case of co-referentiality (e.g., an item of the cohesive tie is outside the text and located in the wider context), its presence may be irrelevant to the internal cohesion of a text (i.e., endophora). In sum, as Halliday suggests, cohesion relations and the linguistic elements present in texts may be exploited by language users to construct:

> "…relations that may involve elements of any extent, both smaller and larger than clauses, from single words to lengthy passages of text; and that may hold across gaps of any extent, both within the clause and beyond it, without regard to the nature of whatever intervenes." (Halliday, 1985, p. 288).

3.2 An Inventory of Non-structural Cohesion Relations

Halliday and Hasan (1976) developed an inventory of non-structural cohesive relations. Those relations that go beyond the grammatical boundaries of the clause may be used by writers and speakers to construct semantical relations that readers and listeners may refer to in the interpretation of a text as an individual, coherent whole. Such a set of non-structural cohesive resources include reference, substitution, ellipsis, and conjunctions, as well as lexical cohesion.

3.2.1 Semantical Relations by Reference

In every language, some items have the property of reference. These items "instead of being interpreted semantically in their own right, they make reference to something else for their interpretation" Halliday and Hasan (1976, p. 31). For example, in languages such as English and Spanish, referential cohesion occurs when two or more items refer to the same person, thing, or idea. Instead of mentioning them again on the second and subsequent mention in the text, those items can be replaced by pronominals (i.e., words that relate to or serve as pronouns, participants and relevant objects), demonstratives, the article 'the', and comparative items (e.g., Bloor & Bloor, 2013; Hasan, 1968). See example (4):

(4) "The religious of St. Isidore's dedicated a chapel to Martin very early and celebrated his feast each year, but the church has not officially included him in the list of saints. That decision has caused problems among some members of this community. Another problem the church leaders may soon need to overcome." (Clugnet, 1910).

Cohesion relations by reference in the excerpt above may include using the pronominals *his him* that refer to Martin; the demonstrative *that* refers to the previous idea and *this* referring to Martin's devotees; the article *the* in the second mention of St. Isidore's church; and the comparative *another* referring to an extra problem.

In addition, Hasan (1968) states that reference occurs in the nominal group (i.e., a word or group of words that form an entity) and that the logical and experiential structures (the ideational function) of the nominal group are of modification. Modification in the nominal group occurs when a word or group of words provides further information (that modify) another word or group of words (the head).

	"The	***many***	***large***	***oil***	***companies***	***in operation"***
Structure: *- logical*	(pre) modifiers				head	postmodifier
- experiential	deictic	numerative	epithet	classifier	thing	qualifier
Word Classes	determiner	quantifier	adjective	noun	noun	prepositional group

Table 3.1 – Logical and Experiential Functions (Bloor & Bloor, p. 143)

Bloor and Bloor (2013, p. 143) describe these structures included in Table 3.1 above. They suggest that the logical structure includes the head of the nominal

group oil companies; inside the modifiers, various experiential functions occur, such as the deictic 'the', whose meaning is dependent on the context; the numerative realised by numerals or quantifier expressions many; the epithet or adjective large; and the classifier oil. Similarly, other types of modifiers may occur in a text. For example, submodifiers realised by adverbs (e.g., very, too, badly) and postmodifiers that also function as modifiers may follow, limit, or qualify the word or phrase, as shown in *companies in operation* included in the parsed sentence above.

Thus, as Hasan (1968) notices, instead of concentrating on the other types of functions (submodifiers and postmodifiers), cohesion by reference is concerned with the structure of the modifier followed by the head and particularly with the word class of the items concerned (e.g., determiners, quantifiers, adjectives, nouns). These word-class elements are used as the co-referentials of pronominals, demonstratives, and comparatives.

3.2.2 Cohesive Relations by Pronominals

Pronominals are the items that refer to persons, objects, and abstractions in a speech situation. Pronominals and their corresponding referents are set out in Table 3.2.

Pronouns	Deictic Function
I, me, my, mine	speaker only
you, your, yours	addressee(s)
he, him, his, she, her, hers	one other person
we, us, our, ours,	speaker and other person(s)
they, them, their, theirs	other persons or objects
it, its	one object or piece of text

Table 3.2 – Deictic Functions of Pronominals

Pronominals create cohesion by specifying their referents and their function in the speech situation, that is, "recognising speaker ('first person'), the addressee ('second person') and another participant ('third person')" (Hasan, 1968, p. 29). As shown in example (5):

(5) "The many large oil companies in operation left the country. They sold their land to smaller ones for a song." Bloor and Bloor (2013, p. 143).

The head of the nominal group in the text above is used as a reference in the second and third mentions. The pronoun *they* makes it unnecessary to keep repeating 'the many large oil companies', 'the oil companies', or even 'the companies'. The possessive determiner *their* relies on its deictic function to obtain the meaning, which may depend on who is talking and to whom they are talking (Bloor & Bloor, 2013).

Similarly, Hasan (1968) argues that pronominals can be subclassified following their functions in the nominal group as shown in Table 3.3:

Function	Type	Items
Pronominal as head of the nominal group.	Non-possessive personal pronouns	I/me, you, he/him, she/her, it, we/us, they/them
Possessive Pronominal as head of the nominal group.	Possessive pronouns	mine, yours, his, hers, its, ours, theirs
Possessive Pronominal as deictic.	Possessive determiners	my, your, his, her, its, our, their

Table 3.3 – Functions of Pronominals (Hasan, 1968)

3.2.3 Demonstratives and the Article 'The'

Demonstratives such as *that this these those* are items that refer to their referents by specifying their location on a dimension of proximity, location, and time. In the nominal group, demonstratives occur by means of the deictic and the head function (Hasan, 1968). Table 3.4 shows the demonstratives that occur in the deictic function and as the head of the nominal group.

Function	Items
Deictic	this, these, that, those, (the)
Head	this, these, that, those

Table 3.4 – Demonstrative Functions

For example, demonstratives can act as the head (6) or as head modifiers (7), but their meaning may not be the same:

(6) "That house seems cheaper."

(7) “That seems cheaper.” Hasan (1968, p. 48).

Hasan notices that in the deictic function, the meaning of a demonstrative is dependent on the context in which it is used. In languages such as English, demonstratives are often used exophorically (i.e., external reference), anaphorically as well as cataphorically. For example, demonstratives signal exophoric situational reference determined by reference, which is outside the discourse as indicated in the following phrases (8) and (9):

(8) “Pick this up!”

(9) “Try that shirt.” Hasan (1968, p. 48).

Similarly, since proximity is usually determined from the point of view of the speaker as in *this* (to refer near) and *that* (not near), the demonstrative *that* is always used anaphorically as seen in the following text (10):

(10) “The technology will generate 25 percent to 60 percent of each campus’ electrical consumption, covering about 10.5 percent of the district’s needs while offsetting more than 57 million pounds of carbon dioxide. That’s equivalent to removing more than 5,600 cars from the road for one year.” (Irvine Unified School District, 2011).

Likewise, *this* may be either used anaphorically as in example (11) or cataphorically in (12):

(11) Getting a new dictionary may be a solution to your spelling problem. This must be a dictionary with more entries.

(12) This may be a solution to your spelling problem. Get a new dictionary with more entries.

Furthermore, the article *the* occurs only in the deictic function. In that respect, Halliday suggests that in the process of distinguishing between *that* as the inclusive or “unmarked” demonstrative to imply a more general meaning, the demonstrative *the* (i.e., the ‘definite article’ the) takes over and extends the ‘unmarked’ characteristic of *that*. In other words, the “definite article” ‘*the’*, which operates only in the deictic function, does not specify information (Halliday, 1985, p. 314). That information may be available elsewhere and may be included in the preceding text (anaphorically) as in (13), cataphorically (14), or homophoric (self-specifying) to refer to something unique as shown in examples (15) and (16).

(13) “Paul bought **a shirt** and a cap, but he returned **the** shirt.”

(14) “**This** is **the** car that my friend destroyed.”

(15) “**The** sun was worshipped by the ancient Aztecs.”

(16) “Have you fed **the** dog?”

Although the examples above show demonstratives working at the clause level, Hasan (1968) includes a text segment that combines cataphora and anaphora relations to characterise the use of the ‘definite article’ *the*.

(17) “We went to Devon for our holiday this year. The holiday we had there was as good as we’ve ever had.” (Hasan, 1968, p. 67).

The is cataphoric when it refers to the relative clause *we had there*, and anaphoric in the second use of holiday, *the holiday*, as presented in (17) above.

3.2.4 Referential Cohesion by Comparison

Comparative items contribute to textual cohesion by setting up a relation of contrast (Halliday, 1985). In the English language, comparative items refer indirectly to some referent that corresponds to their identity, similarity, or difference. Through gradable adjectives and adverbs, languages such as English or Spanish enable the comparison of something by reference. Comparison in referential cohesion generally follows the same deictic directions of reference as highlighted in examples (18) cataphoric, (19) exophoric, and (20) anaphoric.

(18) Mark is confronted with a **bigger** challenge than the **one** I had yesterday.

(19) I saw a **cheaper** watch this morning.

(20) I love your watch. I saw a **cheaper** watch this morning.

Moreover, different languages possess their own means to build cohesion. In particular, the English language expresses comparison by inflecting adjectives and adverbs. English uses the forms –er and –est along with their periphrastic equivalents *more* and *most* (Quirk et al., 1985).

In characterising comparatives that go beyond the sentence level, example (21) below combines the anaphoric referential cohesion *it* along with setting up a relation of contrast by the use of a superlative to describe an object (*the Aupeo iPad app)*, which may be at the upper limit of quality.

(21) “The Aupeo iPad app truly turns your tablet into a great personal radio station. It by far is the most intuitive and easy way to discover new music on an iPad.” (Rottman, 2011).

3.2.5 Ellipsis and Substitution

Like the semantic linking of anaphoric relations where a word in a text refers back to other ideas in the text to obtain its meaning, cohesion by ellipsis enables language users to "presuppose something by means of what is left out" (Halliday, 1985, p. 316). Along with ellipsis, the substitution process provides explicit indications of something omitted within a text or discourse. In fact, substitution, and ellipsis are variants of the same cohesive function.

Example	Function
(22a) A: Thanks for the **meeting**, | let's start the next **one**.	Nominal substitution with one / ones.
(22b) Thursday the sixth **looks pretty good**, and so **does** Friday the ninth.	Verbal substitution with the auxiliary verbs do, be, and have, so or the same.
(22c) A: **Do you think we'll need an hour**? | if **so**, how about the twenty-sixth, at six p.m.?	Clausal substitution: so substitutes the previous clause.
(23) While the older **boy** was very gregarious, the younger (**boy/one was**) much more reserved.	Head of the nominal clause. One, ones (ellipsis).
(24) Boris: I'll have a decaf skinny latte with no sugar, please. Nigel: I'll have **the same**.	Nominal complement. The same; the same thing.
25) Paula seems very smart. She seems as if she is **so**.	So as Attribute.

Table 3.5 – Substitution and Ellipsis Cohesion Relations

While substitution "occurs whenever one of a small class of items 'stands in for an earlier lexical item in the text", ellipsis happens "when what stands in for the earlier item is nothing at all" (Hoey, 1991, p. 5). Both substitution and ellipsis relations can occur in various positions in the English language. Those positions include nominal (functioning as a noun), clausal (as in replacing a clause), and verbal (as in substituting a verb). See Table 3.5 above. For example, the small class of substitution grammatical items, including the verb *do* as a clausal modifier, elliptical head, or substitute head as seen in examples (22: a, b, c) above. In addition, the presupposing *one ones* are nominal substitution words for the noun head and verbal ellipsis *was* in the second clause of example (23); and

the expressions *the same, the same thing* for nominal complement (24); and *so* presupposes an attribute (25) (Halliday & Hasan, 1976).

Moreover, similar to Halliday and Hasan's (1976) cohesion work, Thompson (2013) explains that ellipsis and substitution structures are mostly common in spoken registers and written speech-like registers (e.g., personal blogs). Thompson (2013) notices that contrary to referential cohesion features operating in different parts of a text, in which the meaning "need not be in the immediately preceding message", cohesion by ellipsis "typically operates between adjacent clauses" (p. 220). Similarly, grammarians such as Quirk et al. (1985) have classified ellipsis and substitution as cohesive devices occurring mainly at the sentence level in the English language.

Hence, the notion that cohesion is identified only across sentence boundaries is a reasonable one, provided that cohesion at the sentence level (i.e., within and between sentences) helps the listener/reader to make connections in situations wherein the substituted elements are recoverable and coherent. As some text types and genres expect speakers and writers the inclusion of specific cohesion features (e.g., referentials, ellipsis, substitution) to comply with specific communicative situations (e.g., narratives, personal recounts, personal blogs).

However, the adoption of these cohesion features in L2 contexts may be challenging. For example, the teaching and learning of ellipsis and substitution, occurring in nominal (e.g., one ones, some, the same), verbal (e.g., do, be, have, will), and clausal substitution positions (e.g., so) may be difficult. For EFL students, the learning process of these particular types of cohesion may take some time to be noticed, comprehended, and properly used in texts (e.g., Abata Checa, 2021; Abdulrahman, 2018; Nasser, 2017; Wahid & Wahid, 2020). Namely, the use of verbal auxiliaries commonly used in the English language may be a challenge for L2 teachers and learners of Spanish language background, which does not require verbal substitutions for the auxiliaries 'do; and 'have' to fill what has been said previously. An example of this problem that is common to L2 beginners may be the acquisition of short answers using verbal substitutions that match the corresponding verbal tenses (e.g., Do/Did you enjoy England? Yes, I do/did. / No, I don't/didn't.). In the end, not only do L2 teachers need to find ways to raise awareness of the grammatical rules underlying cohesion by ellipsis and

substitution, but also they may be able to explain how these cohesion types function in various text types and genres (e.g., Al-Jarf, 2001; Drummond, 2017; Petchprasert, 2013).

3.2.6 Cohesion by Conjunction

Hoey (1991) argues that junctions, adjunct-like or conjunctive elements used by language users (e.g., writers and speakers) are aimed to "mark the semantic relations they perceive as holding between the sentences they produce" (p. 5). Junction signals the relationships among events or situations, and they include conjunction links (e.g., and, but), disjunction links (e.g., or), contrajunction links (e.g., although, even though), and subordination links such as while, when, whenever.

However, Halliday (1985) classifies them into one particular group, conjunction. Depending on the use of a conjunction item, its function may be structural (e.g., within a sentence) or non-structural such as in the signalling of relationships between segments of a text, or as in the connection of ideas between clauses, paragraphs, and the whole text. The use of non-structural conjunction in discourse may aid the receiver (i.e., reader/listener) to interpret the producer's main propositions. In that respect, Halliday (1985) explains that conjunction involves the logico-semantic dimension of expansion that not only allows speakers to better understand the relationship between clauses and clause complexes, but also expansion furthers its semantic organisation to paragraphs and the entire text as shown in the following sentence (26).

(26) If you know the answer, you will get promoted.

As shown in example (26), expansion occurs by including the causal-conditional enhancer *if* that is part of the interdependency group (e.g., paratactic, hypotactic) that may occur between clauses. Halliday and Matthiessen (2013) suggest that the secondary clause can also expand the primary clause by means of "elaboration, extension, or enhancement" (p. 443).

At the local level of discourse (i.e., between clauses or within sentences), these three types of expansion can be combined with other functional relationships. Such local-level relationships include interdependency (e.g., paratactic, hypotactic), embedding (e.g., defining relative clauses), and circumstantiation

(e.g., prepositional phrases). However, Halliday and Matthiessen (2013) propose making a distinction between the structural and non-structural use of conjunctions to mark relations between semantic domains in text segments. The logico-semantical relations marked by conjunction in a structural relation as in sentence (26) above, may follow a prototypical function for marking the continuing clause connection, and when analysed, these types of structure markers "are obligatory thematic as structural Theme".

Functional Relationship / Type of Expansion			**Cohesion Between Sentences**
ELABORATION	By opposition	exposition	In other words, That is (to say) Put another way, Put differently
		example	For example, For instance, Like To illustrate, By way of example
	By clarification	corrective distractive dismissive summative verifactive particularising resumptive	Or rather, At least, To be more precise By the way, Incidentally, By the by In any case/event, Anyway, Anyhow In short, To sum up, In conclusion, Actually, As a matter of fact, In fact In particular, More especially, Notably As I was saying, To resume
EXTENSION	By addition	positive negative adversative	And, Also, Moreover, In addition But, Yet, On the other hand, However, Nevertheless, Notwithstanding
	By variation	replacive substractive alternative	Instead, On the other hand Otherwise, Apart from that Alternatively, Or (else)
ENHANCEMENT	Spatio-temporal	extent point(s)	There
	Time	extent point(s) prior/subsequent	Throughout, Simultaneously, Previously, Next, Finally, At once Meanwhile
	Manner	means quality comparison	Thus Likewise
	Causal-conditional: cause	reason result purpose	Therefore Consequently To that end
	Condition	positive negative concessive	In that case Otherwise Nevertheless
	Matter	respective	In that respect

Table 3.6 – Non-structural Conjunction Items (Halliday, 1985)

On the other hand, conjunction in a non-structural relation "serves as a conjunctive adjunct…and are very commonly thematic" Halliday and Matthiessen (2013, p. 611). Table 3.6 above shows the types of expansion and the functional relationships of conjunctive adjuncts in the English language suggested by Halliday (1985, p. 328). Such non-structural items are exemplified in the text (27):

(27) "Doctors and lawyers face a difficult situation in Balloch, Pakistan. **For example**, the Pakistani Medical Association reported that 32 doctors are missing, and 28 doctors have so far been killed. **In addition,** dozens of lawyers are missing, and many have been extra-judicially killed after the abduction. **Besides** this, generally, there is no rule of law, and any person can be picked up and killed for any reason. **However**, a new situation has arisen in the policies of the law enforcement agencies in that they have extended their jurisdictions to other provinces. **Today**, Baloch citizens are being abducted from Karachi, the capital of Sindh province, where they go for higher education" (Scoop Media, 2013).

In example (27) above, the writer uses non-structural conjunctive adjuncts to elaborate (e.g., For example), extend (e.g., In addition, Besides, However), and enhance (e.g., Today) various topics surrounding one central theme.

Halliday (1985) refers to these types of conjunctive adjuncts as non-structural, which may enable language users to expand their propositions between clause complexes (i.e., between sentences, between paragraphs, and the whole text).

3.3 (Non-structural) Cohesion Relations by Lexis

Lexical cohesion refers to a range of semantic relations that can exist between vocabulary items. Halliday and Hasan (1976) divide them into "reiteration" and "collocation" (p. 288) as shown in Table 3.7.

Lexical Cohesion Type	Referential Relation	Examples
Reiteration (a) same word (repetition) (b) synonymy (or near synonymy) (c) superordinate (d) general word	same referent inclusive exclusive unrelated	(boy – boy) (walk – stroll) (travel – ride) (man – ridiculous)

Table 3.7 – Lexical Categories by Halliday and Hasan (1976)

The reiteration sub-category covers a variety of ways in which one vocabulary item may be understood to reminisce the sense of an earlier item (Hoey, 1991).

According to Halliday and Hasan (1976), such reiteration variety includes (a) the identical repetition of a lexical item (rice – rice); (b) or modified versions of lexical items such as synonyms or near-synonyms (beautiful: attractive, pretty, lovely, stunning); (c) superordinate words (such as flower as a superordinate and tulip, rose, geranium as subordinates or hyponyms); as well as (d) the meaning relations given by general words (e.g., thing, person, make, do), which co-refers anaphorically to another word as indicated in example (28).

(28) There is a man dancing in the rain.

a. The man is going to catch a cold if he continues. (repetition)

b. The guy is going to catch a cold if he continues. (near-synonym)

c. The person is going to catch a cold if he continues. (superordinate)

d. The ridiculous is going to catch a cold if he continues. (*general word*)

Although reiteration in Halliday and Hasan (1976) by word repetition may be a clear relation, reiteration by synonymy superordinate and general words is an ambiguous and difficult one. For one thing, Martin (1992) asserts, “the distinction between hyponymy (part of synonymy) and superordination is by no means clear” (p. 287).

Likewise, Hoey (1991) notices that there is a cline between reiteration lexical items (e.g., superordinate, general word) and their relations that may be “of less significance for text analysis than for lexical analysis to distinguish them” (p. 6).

More relevant, Hoey observes that while grammatical cohesion relations (reference, substitution, conjunction) are markers of textual relations, the various types of “lexical reiteration are in the first place types of *lexical* relation and only secondarily markers of textual relation” (Hoey, 1991, p. 7).

However, although this distinction may also apply to the lexical relations that occur in collocation as a secondary marker of textual relation, Halliday and Hasan (1976) argue that cohesion by collocation “is achieved through the association of lexical items that regularly co-occur” (pp. 284-287).

Such co-occurring lexical items may include synonyms, near-synonyms, superordinates, ordered and unordered lexical sets (Monday…Tuesday;

white…black), pairs of opposites (*boy-girl*), as well as longer word sequences or cohesive lexical chains (e.g., poetry…literature…reader …writer…style).

Even though these lexical items are part of mutually exclusive categories that "often stand in some recognisable semantic relation to one another", the proximity of these lexical items in a discourse is what may contribute to the texture of a text (Halliday & Hasan, 1976, pp. 284-287).

The systematic semantic relationship between pair words, sets of words, and lexical chains is presented by their tendency to share the same lexical environment. As Halliday and Hasan (1976) assert:

> "In general, any two lexical items having similar patterns of collocation –that is, tending to appear in similar contexts – will generate a cohesive force if they occur in adjacent sentences." (p. 286).

Martin (1992) also observes that Halliday and Hasan's (1976) collocational category was devised in the context of cohesion analysis. In other words, their interest in collocation was semantical "rather than probabilistically defined in terms of some" "recognizable lexico-semantic (word meaning) relation" (Halliday & Hasan, 1976, p. 285; Martin, 1992, p. 288).

Nonetheless, cohesion by lexical relations proposed by Halliday and Hasan (1976) has been furthered by Hasan (1984; with Halliday 1985), Halliday (1985, 1994), and other academics (e.g., Hoey, 1991; Martin, 1992; M. McCarthy, 1998; Tanskanen, 2006).

3.3.1 Expanding the Reiteration and Collocational Categories

In her work on coherence and cohesive harmony intended to analyse narratives, Hasan (1984) expands the notion of cohesive chains mentioned in Cohesion in English by Halliday and Hasan (1976). Rather than emphasising a new category of lexical items, Hasan (1984) emphasises that what makes a text coherent is not only the presence of lexical chains but the interactions that occur with one another. Along with Halliday (1985), Hasan (1984) expands the explanation of lexical relations by introducing general and instantial categories. Hasan's (1984) general category includes the repetition relation using similar words, as well as the lexical relations that can be described by the general semantic system of a language, such as synonymy, antonymy, hyponymy, and meronymy (part-whole relation). See Table 3.8.

Lexical Cohesive Devices Componential Relations		
Device	**Examples**	**Tie Relation**
A. General i. repetition ii. synonymy iii. antonymy iv. hyponymy v. meronymy	walk, walking, walked walk, stroll, hike walk, ride travel, walk — ride (co-hyponyms) tree, bark — leaves (co-meronyms)	Co-classification or Co-extension
B. Instantial i. equivalence ii. naming iii. semblance	I'll be the clerk, you the client The girl was called mentor Her office is like home	Co-reference or Co-classification

Table 3.8 – General and Instantial Tie Relations

The instantial category, on the other hand, refers to the lexical relations which are not general but created in the text as in the equivalence of meaning in "*I'll be the doctor, you the patient*", or the cohesive relations created by naming "*that man is called chief*", and semblance "*her face is like an angel*" (Hasan, 1984, p. 202).

Moreover, Halliday and Hasan (1985) argue that there is an interdependency between grammatical and lexical-semantic relations to channel meaning as a coherent whole. They argue that three types of componential relations (i.e., semantical or tie relations) may occur in a text: "co—referential ties", "co—classification ties", and "co-extension ties" (Halliday & Hasan, 1985, pp. 73-94). (See Table. 3.8 above).

Like grammatical cohesion, co-referential and co-classification relations also occur in lexical relations. In that respect, while co-referentiality relates two or more items in a text having the same referent, co-classification occurs when an item in the text has a different referent, but the relationship belongs to the same class. On the other hand, co-extension ties, which only occur in lexical relations (e.g., general reiteration), belong to what Hasan refers to as the same "general field of meaning" (Halliday & Hasan, 1985, p 74). Examples (29) and (30) below may show how grammatical and lexical relations work separately.

(29) Martha goes to bed late. We brought her a gift. She likes movies. My brother's house is next to hers.

(30) A dog is running in the park. A park is an area of land for recreation. Gardeners grow and take care of flowers. Plants can be bought in the supermarket.

Although the sentences in example (29) above may be understood by using grammatical referential ties (her, she, hers), there is no guarantee that they refer to Martha. Or, as Halliday and Hasan (1985) state, “there is nothing in the text that points you in the direction of that particular interpretation” (p. 83). Likewise, in example (30), which includes examples of lexical relations such as word repetition (park), near-synonyms (park, area), superordinate (plant), and hyponym (flower), their inclusion may be insufficient to have a cohesive and coherent text. More relevant, Hasan notices that “grammatical and lexical cohesion move hand in hand, the one supporting the other” (Halliday & Hasan, 1985, p.83).

To exemplify the interdependency of lexico-grammatical relations, Halliday and Hasan (1985) analyse the relations that occur in lexical chains. They argue that cohesion in a lexical chain is “formed by a set of items, each of which is related to the others by the semantic relation of co-reference, co-classification and/or co-extension” (p. 84).

Halliday and Hasan (1985) subclassify those semantical relations into identity chains and similarity chains. In the identity chain, the relation that occurs is that of “co-reference: every member of the chain refers to the same thing, event or whatever” (p. 84). In similarity chains, members can be related to each other by either co-classification or co-extension. As discussed previously, while co-classification refers to non-identical members of the same class or things, events, and circumstances, co-extension relates to members of related classes of those things and events that “refer to something within the same general field of meaning” Halliday and Hasan (1985, p. 85).

Taboada (2004) states that while identity chains (i.e., co-referential relations) are established in the text, cohesion relations in similarity chains are non-text bound. Instead, co-classification and co-extension relations are built “on our knowledge of vocabulary and of the world, they are established outside the text” (p. 168).

Hoey (1991) exemplifies these relations in example (31):

(31) “once upon a time, there was a little girl

and she went out for a walk
and she saw a lovely little teddy bear
and so she took it home
and when she got it home, she washed it
and she had the teddy bear for many weeks and years" (p. 15).

Three identity chain relations can be seen in the text above:

1) girl refers to she five times
2) teddy bear to it three times
3) and the repetition of home

Two similarity chain relations of unrelated items to each other occur with the reached members.

1) went out, got…home.
2) took, had (both describing possession)

Similarly, the interaction between distinct chains (grammatical and lexical) includes the relationships that occur between the members of each chain. In the example above, grammatical relations include the *actor* (girl) from the identity chain and the *actions* (went out and got home) from the similarity chain. Halliday and Hasan (1985) notice that "at least two members of one chain should stand in the same relation to two members of another chain" (p. 91).

The chain interactions between textual elements proposed by Halliday and Hasan (1985) is what may help to understand how language users (namely producers) construct a cohesive text. Hoey (1991) also notices that the combination of chains "militates against consideration of how the sentences relate to each other as sentences" (p. 16).

Lexical Relation	Examples
Repetition	Same word
Synonymy Types:	
synonymy (general)	sound – noise
superordinate	Travel: walk
hyponyms (co-hyponym)	walk – ride
meronymy (co-meronymy)	Tree: bark – leaf
antonymy	rich – poor
Collocation	Words that tend to co-occur

Table 3.9 – Repetition, Synonymy, and Collocation (Halliday, 1985)

In the same vein, another category (see Table 3.9 above) on lexical cohesion is presented by Halliday (1985, pp. 331-333) who explains how repetition, synonymy, and collocation contribute to the cohesion of a text. Even though his category of repetition (e.g., dine, dining, diner, dinner) harks back to Halliday and Hasan's (1976) work, Halliday's 1985 version introduces a variety of relations that occur under the label of synonymy. For example, the "straightforward" synonym (sound – noise), the higher level of generality of synonyms in the narrower sense (such as in birds and blackbirds), superordinates and hyponyms (travel: walk), co-hyponymy (walk – ride), meronymy (tree: bark), co-meronymy (bark – leaf), and antonymy (rich-poor), which also has a cohesive effect in texts are also included in Halliday's 1985 work.

Furthermore, Halliday (1985) observes that some lexical cohesion items do not depend on the general semantic relations of word senses (e.g., synonymy, hyponymy, or hypernymy). Instead, they depend on their particular association, that is, a tendency to co-occur in a text. The tendency of vocabulary items that co-occur is what Halliday (1985) refers to as collocation. He sees collocation as one of the factors on which language users build their expectations of what is to come next in a text. As is shown in example (32.)

(32) "A little fat man of Bombay
Was smoking one very hot day
But a bird called a snipe
Flew away with his pipe
Which vexed the fat man of Bombay" (Halliday, 1985, p. 333).

In the text above, Halliday (1985) argues that a strong collocational bond occurs between smoking and pipe. Their cohesive presence is not only semantic, but their relationship also shows a direct association between those two words. He notices that "If pipe is in the text, then smoke may well be somewhere around" (Halliday, 1985, p. 333).

Yet, although the collocation notion first introduced by J.R. Firth (1957) has been considered by academics (e.g., Halliday & Hasan, 1976; Hoey, 2005; Pace-Sigge, 2013; J. M. Sinclair, 1987), Hoey (2005) notices that the notion of collocation has different definitions and purposes among scholars interested in corpus analysis and systemic functional theory (e.g., Leech, 1974; Matthiessen, 2009; Partington, 1998; J. Sinclair, 1991). Textual, statistical, and psychological

approaches have been adopted to define and investigate collocation. (e.g., Partington, 1998). For example, Halliday and Matthiessen (2013) assert that collocations can be related to lexical items specifically associated with particular registers and text types. Furthermore, they suggest that collocations in a corpus may be measured to determine:

> "the degree to which the probability of a word (lexical item) increases given the presence of a certain other word (the node) within a specified range (the span)" (Halliday and Matthiessen (2013).

However, Hoey (2005) argues that the definition provided by Halliday and Hasan (1976), who see collocation as "a psychological one, in which words are regularly associated in the mind", is "hard to operationalise" (Hoey, 2005, p. 4). As a consequence, Hoey (2005) notices that Hasan (1984) and Halliday (1985) subsequently abandon the notion of collocation to replace it with a set of semantical relationships (e.g., synonyms, hyponyms).

According to Halliday and Hasan, the combination of collocation and synonymy relations assist in the unity of a text. Although collocation tends to carry a stronger cohesive effect than synonymy, it has been suggested that if both cohesion relations are present, they mutually reinforce each other. See excerpt (33).

(33) "The familiar phrase that starts fairytales worldwide — "once upon a time" — triggered the development of a sustainable **food programme** in South Africa. Beulah Fredericks, executive director of the Cape Town-based Community Development **Foundation** Western Cape (CDF WCape), smiles when she recalls how the **project** started. After a local community-based organization in one of Cape Town's townships **applied for** a $50 **grant** to cover one month's operating **expenses** for **a soup kitchen that feeds the poor,** Fredericks visited the site, listened to their stories, engaged in conversation and then declined the request.

A **soup kitchen** is an obvious solution," Fredericks told the group.

But after listening to your stories, I see you are a community that has it in you to move beyond **the soup.** We cannot give you $50 to buy food for **the soup kitchen** because next month you will be hungry again and ask for another $50. Why not start **a community garden** instead?" (Charles Stewart Mott Foundation, 2013).

The text above shows the combination of lexical cohesion relations (synonymy and collocation) as contributors to the texture of a text. And while the words in bold in the text refer to the words that co-occur, the underlined ones refer to a variety of word sense relations such as synonyms or near-synonyms. For

example, the lexical items in bold show that there is a strong collocational bond between *food programme* and the words or phrases such as foundation, project, applied for a grant, expenses, a soup kitchen that feed the poor, the soup, the soup kitchen, and community garden. Similarly, the synonymy relations also contribute to cohesion, such as in the repetition of items from fairytales or stories throughout the text, as well as examples of superordinates (food) and hyponyms (soup).

3.3.2 Lexical Cohesion by Discourse-Specificity

M. McCarthy (1998) argues that there is a difference between cohesion relations at the sentence level of written texts and the cohesion that occurs in chunks of spoken turns. In his analysis of lexical cohesion in spoken texts, he noticed that natural conversational data could not be adequately examined with the cohesion models developed for written discourse.

Category	Equivalent to Hasan's (1984) Category
Equivalence:	Synonymy
Inclusion	
Specific – general:	Hyponymy – superordinate
General – specific:	Superordinate – hyponymy
Opposition:	Antonymy

Table 3.10 – Lexical Category, M. McCarthy (1998)

M. McCarthy acknowledges that cohesion by exact repetition is a feature of speech and writing. However, to analyse speech interactions, he circumvented repetition and focused on equivalence, opposition, and inclusion, which may correspond to Hasan's (1984) synonymy, antonymy, and hyponymy lexical relations (see Table 3.10 above). His reasoning to downplay repetition in speech may not only stem from how speakers use repetition between them (e.g., using exact words and word sequences), but mainly because propositions in conversations for interactive purposes are "repeated in a non-identical form, either re-formulated, restructured or in some way given different lexical form" (M. McCarthy, 1998, p. 185). It is in speech rather than in writing, M. McCarthy (1998) asserts, that these relexicalisations operate more powerfully.

In addition, Carter and M. McCarthy (1998) notice that the general semantic relations of synonymy and antonymy may not be suitable to describe lexical relations between items in use. Instead, they suggest that the discourse-specific terms of instantial relations of equivalence, opposition, and inclusion are more related to "the relations we call instantial are then labels for lexical value rather than abstract meaning; they are the properties of particular texts" (Carter & M. McCarthy, 1998, p. 203). In sum, Carter and M. McCarthy (1998) emphasise that lexical relations would more accurately reveal the fact that a relation between two items is dependent upon the text in which it occurs, rather than being an instance of an abstract meaning relation.

3.3.3 Repetition Types for Tracking Cohesion in a Text

Hoey's (1991) work focuses on the text-forming properties of lexis to show that lexical non-structural patterns have a vast capacity to form a variety of multiple relationships in a text. Lexical cohesion relations may essentially consist of the analysis of different repetition types occurring across clauses and sentences connecting as wholes. The intensity of repetition relations, and not merely specific ties, in a text may lead to indicate how intimate or close is the cohesion relationship in the text.

Such repetition types and definitions include (a) *simple lexical repetition* that occurs when an exact repetition (e.g., foot) or *repetitions of the same word* including grammatical inflexions (e.g., feet); (b) *complex lexical repetition* occurring when two lexical items share the same morpheme (i.e., the smallest meaningful unit in a language), "but are not formally identical, or when they are formally identical, but have different grammatical functions" (such as move as a noun and moving as a verb); (c) *simple paraphrase repetition* occurs "whenever a lexical item may substitute another in context without loss or gain in specificity and with no discernible change in meaning" (Hoey, 1991, p. 62). The multiple-repetition types of lexical cohesion suggested by paraphrase examples may include near-synonyms (e.g., to sedate, to drug, to medicate); and (d) *complex paraphrase* occurs when "two lexical items are definable such that one of the items includes the other, although they share no lexical morpheme" (Hoey, 1991, p. 64). These types of repetition are presented in Table 3.11.

Type of Relation	Examples
Repetition:	
a) simple	foot – feet
b) complex	a move – moving
c) simple paraphrase	to sedate – to drug
d) complex paraphrase	heat – cold
e) substitution	a wheelchair – it
f) co-reference	Eric and Shirley – the couple
g) ellipsis	the golden bridge – the bridge
h) deixis	the new students – those students

Table 3.11 – Different Types of Repetition (Hoey, 1991)

Even though the categories (e – h) described in Table 3.11 above may be linked to grammatical cohesion relations, Hoey's emphasis is on how substitution, co-reference, ellipsis, and deixis relate to vocabulary items rather than just on grammatical relations.

In addition, instead of exclusively relying on lexical chain combinations or lexical tie interactions, Hoey's (1991) work focuses on Winter's (1977) ideas on repetition as well as Phillips' (1985) thoughts on collocation in extended texts. Hoey argues that repetition not only occurs as ties between items but, as Winter (1977) noticed, repetition links clauses or sentences in which a repeated or replaced item occurs. Hence, the focus on repetition is not merely on the ties that occur between them, but on the meaning of the word replaced that links to the intended meaning of the new clause or sentence. Rather than focusing on the grammatical linking of narratives, Hoey aimed at the analysis of scientific texts because "in non-narrative texts, it is the lexical links that dominate the cohesive organisation" (Hoey, 1991, p. 74).

Although the following text segment takes a narrative form, Hoey's model may probe relevant in the investigation of narrative and non-narrative texts.

(34) "(**a**)The couple that (**b**) broke my heart. (1) He was the bass player for another band. His name was Eric Ward, and he was black; her name was Shirley Pappion, and she was white and elderly. (2) She was also in a wheelchair, which was why I noticed her on the dance floor as Eric was pushing her chair across it. (3) I just assumed he was pushing her for purely utilitarian reasons, to get her across the floor to the other side. (4) I saw she was moving her feet –at first, I thought just to help him–and thought no more of it. (5) Then, my mind began to connect some dots. (6)

> Her feet weren't just moving–they were shuffling–to the distinctive Cajun shuffle beat I had just been instructed in." (Altman, 2015).

Hoey acknowledges that repetition connections occur not only between ties as suggested by Halliday and Hasan (1985) but also the linking happens with new information provided by other constituents of a sentence. This seems to occur in the example above, where the first sentence is divided into (a) and (b), linking to different sentences and their constituents (1 – 6).

Hoey (1991) argues that following the linking repetition model may enable an examination of different elements of a sentence, such as synonyms, antonyms, and paraphrasing words. In addition, instead of focusing on ties and their directionality, Hoey's model considers the degree of relevance of how sentence constituents link to each other. Some links may be central, and others marginal to other sentences and their constituents. Since the position of a repeated item in a clause (such as new vs old information) changes, this may lead to integration for lexical analysis and clausal analysis of text cohesion.

Moreover, Tanskanen (2006) noticed that Hoey's idea to use repetition relations as cues to link sentences related to the meaning of the text "and thus also reveal the organisation of the text" (p. 42). This comment may be linked to Hoey's (1991) view on texts and text organisation (as opposed to rigid text structure), which may be compatible with Halliday and Hasan's (1985) structural view associated with the genre. Hoey (1991) states that:

> "…text has some organisation, but that this organisation does not have the status of structure, a structural description being one that permits one to make predictive statements about data under examination" (p. 13).

Hoey's ideas on text organisation may also be linked to Phillips's (1985) assertions that while there is an obvious relation between information contained in book chapters and vocabulary, another less obvious one indicates that:

> "…vocabulary is tightly organized in terms of collocation and that in broad terms it allows the identification of topic opening and topic closing and of the text's general pattern of organization." (Phillips, 1985, p. 24).

In sum, it is assumed that long-distance lexical relations that occur systematically enable us to see the organisation of long stretches of texts (e.g., book chapters) without considering semantical recourses or intuition, but essentially using a long string of characters such as clusters of repetition and collocation.

3.3.4 Expanding the Collocational Category

Martin (1992) organises lexical cohesion into three main interrelated categories: "taxonomic, configuration/nuclear and activity sequence relations" (p. 290). These categories are shown in Table 3.12.

Categories	Relation Type	Examples
Taxonomy	Part/whole	Relations among game-set-match and player-serve-ball
Configuration /nuclear	Agent Process Medium structure	Player serve – opponent return
Activity sequence	Sequential	Player volley

Table 3.12 – Collocation Sub-categories (Martin, 1992)

Martin's part-whole taxonomic category that describes the actions, people, places, things, and qualities, shares similarities to Halliday and Hasan's (1976, 1985) analysis of cohesion in the reiteration subclasses such as repetition, synonymy, superordinate, hyponymy, meronymy, co-hyponymy and co-meronymy, and contrast.

However, Martin redefines the lexical relations on collocation explained by Halliday and Hasan (1976) and Halliday (1985) by furthering the configuration or nuclear category as well as categorising text activity sequences (see Table 3.12 above). And, while nuclear relations reflect the ways in which "actions, people, places, things and qualities configure as activities", the relations that occur in the activity sequence are based on the way in which "the nuclear configurations are recurrently sequenced in a given field" (Martin, 1992, p. 321).

Martin argues that based on field description, the discourse semantic unit underlying lexical items and entering into cohesive lexical relations can be set up. Since it is an experientially defined unit, it will be referred to as a message part to bring out its metafunctional relationship with conjunction.

In his redefinition of lexical relations, Martin (1992) stems from Halliday and Hasan's (1985) notion of field in discourse, that is,

> "…what is happening, to the nature of the social action that is taking place; what is it that the participants are engaged in, in which the language figures as some essential component" (Halliday & Hasan, 1985, p. 12).

For a given field, Martin (1992) argues that:

> "the message part realises (i) one of the features taxonomising people, places, and things, or (ii) one of the actions configuring with people, places and things and entering into activity sequences, or (iii) one of the qualities associated with people, places, things, and actions" (p. 293).

By exemplifying tennis as a field, not only Martin notices that the tennis field comprises taxonomy relations (like the ones mentioned in Halliday & Hasan, 1976) but also many nuclear and a variety of activity sequences occur. These relations are realised linguistically through temporally ordered chains of Agent Process and Medium, with their attendant participant and circumstantial roles.

Martin's (1992) example of tennis includes, among other activity sequences, playing, coaching, commenting, analysing, viewing, training, club meetings, tournament presentations, interviews, grading and so on. He argues that the participants and processes in these activities overlap, but they are not identical. At the same time, each of these institutionally focused activities enables participants to interact by sharing a specific type of register, such as in the terminology used to refer to "a game played with strung racquets and a furry hollow ball" (Martin, 1992, p. 292).

3.3.5 A Bespoke Categorisation of Lexical Relations

Stemming from various works that describe lexical relations such as synonymy, hyponymy, meronymy (Halliday & Hasan, 1976, 1985), collocation and collocational triggers (Jordan, 1984; Martin, 1992), discourse-specificity (M. McCarthy, 1998), and lexico-grammatical reiteration items (Hoey, 1991), Tanskanen (2006) attempts to bring them all together to study cohesion and coherence in spoken and written texts.

Tanskanen (2006) divides lexical relations into two categories, reiteration and collocation. Reiteration comprises eight sub-categories: (1) repetition, for example, includes simple and (2) complex repetition with identical and almost identical morphological variations (he – his, shoe – shoes, want – wanted); (3) substitution in lexical reiteration takes the form of grammatical substitution, including pronouns that substitute nouns (e.g., personal pronouns to substitute for the proper name of a person); (4) equivalence relates to synonymy, which emphasises lexical semantics as well as other labels for lexical relations (e.g.,

water = H2O); (5) generalisation refers to the relationship that exists between specific and more general items (e.g., Ecuador – Latin American countries); (6) specification covers the general – specific relationship (e.g., children – three young daughters); (7) co-specification relates to the relationship of meaning between more specific words (e.g., pizza, hamburger) and a broader meaning relation (e.g., food); (8) contrast refers to the opposite relation between items (e.g., personal – public). Lexical categories according to Tanskanen (2006) are set out in Table 3.13.

Category	Sub-categories
Reiteration	simple repetition
	complex repetition
	substitution
	equivalence
	generalisation
	specification
	co-specification
	contrast
Collocation	ordered set
	activity-related
	elaborative

Table 3.13 – Lexical Relations (Tanskanen, 2006)

In addition, collocation relates to "the association created by habitually co-occurring lexical items" (Tanskanen, 2006, p. 60). Tanskanen divides collocation into three sub-categories: (1) ordered sets (e.g., the days of the week, months, colours, family-related terms); (2) activity-related collocation refers to the association of items in a specific activity (e.g., serve, deuce, ace); and (3) elaborative collocation results from the repetition of previous topics or items that can be used to clarify the association between an item and its reiteration or re-entering.

3.4 A Diversity of Views on Cohesion

Ever since Halliday and Hasan (1976) published their book Cohesion in English, other academics have also analysed the set of cohesive resources used by speakers and writers to help them to keep the unity and consistency of a text. However, the term cohesion, which may refer to structural and non-structural relations, varies depending on the focus of the analysis. For example, linguists such as Gutwinski (1976) have also studied textual cohesion; however, Gutwinski's work focused on structural cohesion relations, which occur in the ordering of clauses and sentences, such as parallelism and structural similarity of active and passive voice sentences. According to Gutwinski (1976)

> "The term COHESION is used in this investigation for the relations obtained among the sentences and clauses of a text. These relations, which occur on the grammatic stratum, are signalled by certain grammatical and lexical features reflecting discourse structure on a higher, semologic stratum. These features, such as anaphora, subordination and coordination, are called COHESIVE. They account for what may also be referred to as the textual connectivity of sentences and clauses. They do not by themselves constitute cohesion, but they mark which clauses and sentences are related and in what manner." (p. 26).

3.4.1 Cohesion as Another Standard of Textuality

Similarly, in their goal to explain the communicative purpose of any text (i.e., textuality), De Beaugrande (1980, 1984, 1997) and De Beaugrande and Dressler (1981) have included cohesion as a standard of textuality. In their view, cohesion:

> "…concerns the ways in which the components of the surface text, i.e., the actual words we hear or see, are mutually connected within a sequence. The surface components depend upon each other according to grammatical forms conventions, such that cohesion rests upon grammatical dependencies." (De Beaugrande & Dressler, 1981, p. 3).

According to De Beaugrande and Dressler (1981), cohesion, as a standard of textuality, is used to uphold the continuity of events that occur in a text. Each event or "occurrence is instrumental in accessing at least some other instruments.." The continuity of occurrences in cohesion is achieved by close-knit patterns of syntax (i.e., the combination of words to form sentences and the language-specific governing rules in the formation of those sentences), which operate in the speaker's "active storage" or short-term working memory, as it is explained, "surface structures are more predominantly maintained in a "short-

term" storage and conceptual content in a "long-term" storage" (De Beaugrande & Dressler, 1981, p. 3).

Similar to Halliday and Hasan (1976), a framework on cohesion is proposed by De Beaugrande and Dressler (1981) to describe the various cohesive relations that occur in short-range stretches of explicit cohesive grammatical patterns as well as long-range stretches that may be conducted by re-utilising previous elements or patterns.

Such devices include one group that allows speakers to preclude uncertainty: *recurrence* as in the exact repetition of linguistic elements and grammatical patterns; *partial recurrence* or the shifting of similar language items (e.g., from noun to verb, word stems); *parallelism* as in the reuse of grammatical structures filled with new propositions; and paraphrasing (i.e., similar to rephrasing or summarising).

Another group of cohesive elements for 'everyday' use include *pro-forms* (i.e., function words or expressions that express the same content) and *ellipsis* that enables speakers to omit some structural components, but only if a full version of the text segment is recoverable.

One last group in the De Beaugrande and Dressler (1981) taxonomy includes devices that explicitly signal relations of events and situations in a text, such as *tense* and *aspect* to "signal relative times, boundedness, unity, order, and modality" (p.28); as well as *junction* elements to explicitly mark various relationships in a text such as additivity, alternativity, incompatibility, and subordination. In sum, cohesion is studied as a detached notion, that is, independent of other standards of textuality such as coherence.

3.4.2 Cohesion from the Producer's Perspective

In the same vein, Campbell (1995) analyses the close relationships that exist between cohesion and coherence in the continuity of a text by delimiting coherence from the perspective of the discourse receiver (reader and listener) and cohesion from the producers of discourse (writers and speakers). In particular, Campbell (1995) argues that cohesion is "concerned with cues placed in a discourse by a producer". These cues placed in the discourse by producers may "influence the recipient's sense of continuity" (p. 38). Cohesion cues for

producing coherent discourse include non-linguistic elements, such as the visual elements (e.g., indention, italic print, font colour, margins, along with visual forms of charts, diagrams, charts, and tables), auditory and phonological elements (e.g., rhyme, meter, alliteration). To support his claim, the principles of similarity (the cohesive effect of similar discourse elements) and the principle of proximity, which recognise the effects of spatial and temporal proximity in discourse, are brought to attention.

However, contrary to Halliday and Hasan (1976) on cohesion by conjunction, Campbell (1995) argues that conjunction cannot be approached by referential elements of similarity (such as the ones found in reference, ellipsis, substitution, and lexical cohesion), but

> "…conjunctive elements must be seen as explicit markers of continuity rather than as cohesive elements that imply continuity through their foregrounding function" (Campbell, 1995, p. 51).

In other words, although Halliday and Hasan's (1976) taxonomy of cohesion is explained by the cohesion principle of semantic similarity, Campbell's conjunctive elements establish continuity of discourse by explicitly relying on their lexical meaning. Overall, the cohesive elements, according to Campbell, are introduced by the producer enabling a text with a stronger sense of continuity.

3.5 Beyond Endophoric Cohesion Relations

In addition, Brown and Yule (1983) examine the cohesive elements that bind a text together, enabling writers and speakers in the continuity and development of discourse which may force the co-interpretation of propositions in the minds of readers and listeners. Even though Brown and Yule follow the taxonomy on cohesion provided by Halliday and Hasan (1976), they draw some differences, such as the distinction between reference and co-reference. Reference, according to Halliday and Hasan (1976), is described as

> "…the information to be retrieved is the referential meaning, the identity of the particular thing or class of things that is being referred to; and the cohesion lies in the continuity of reference, whereby the same thing enters into the discourse a second time" (p.31).

However, Brown and Yule argue that other types of references may occur in a text that goes beyond the referring elements of a text. They use the term co-

reference to describe internal (endophoric) and external (exophoric) cohesive references essential to maintain the unity of a text. They suggest that not only the reference relations described by Halliday and Hasan (1976) (reference, substitution, ellipsis, and lexical relations) present in a text can occur to decode the meaning of a text, but co-references may happen in a variety of situations, and their inclusion may be necessary for the understanding of a text. Such co-references are illustrated in the exophoric or external relations that some texts may need to rely on to be adequately understood. In addition, co-referentials are included in the anaphoric relations of repeated forms, partial repeated forms, lexical replacement, pronominal forms, substitutional forms, and elided forms.

Brown and Yule (1983) also mention other co-reference relations, such as the ones derived from lexical relations, by furthering structural relations, syntactic repetition, consistency of tense, and stylistic choice. In sum, their analysis and explanation of co-reference led Brown and Yule to question the notion of cohesion: “Is cohesion necessary to the identification of a text?” “Is cohesion enough to guarantee the identification of a text?”, and “Whether cohesion will guarantee coherence?” (Brown & Yule, 1983, pp. 194-195).

3.5.1 The Interweaving of Meaning

Schmitz et al. (2017) define cohesion as a text component established by using linguistic markers. “These refer to lexical, grammatical, and syntactical expressions which create a red thread within a text” (Schmitz et al., 2017, pp. 1117-1118).

Even though this definition of cohesion may relate to the one given by Halliday and Hasan (1976), Schmitz et al. (2017) emphasise the interweaving of meaning, which may occur in different segments of a text, is described by the presence of local and global cohesion markers.

However, while cohesion markers at the local level support the building of relations of meaning with proximate sentences (e.g., by using reference substitutes and conjunctive words), global-level cohesion markers connect larger entities of a text through the use of references of previous paragraphs, headlines, topic sentences, and short summaries. Unfortunately, Schmitz et al. (2017) fall short to describe the role of other lexical relations in building a text (e.g., word repetition, and synonyms).

3.5.2 Similar Idea Different Research Paths

In order to determine the influence of cohesion elements in the interpretation of text segments, academics have taken different paths in the use, definition, and research of cohesion features using manual and automatic techniques. Such perspectives have included (a) the analysis of explicit cohesive devices in academic written texts (Hinkel, 2001); (b) the function of words or phrases (e.g., conjunctions, interjections, adverbs) to organise discourse into segments known as discourse markers (Fraser, 2009; Schiffrin, 2001); (c) the semantic (meaning) relations of sentences and their contexts (Martin, 1992); and (d) the cohesive lexical relations in discourse (Hoey, 1991; Winter, 1977).

Additionally, in the investigation of cohesion features occurring within sentences, connections between sentences and paragraphs, and macrostructures of text discourse such as global coherence (i.e., general meaning and text organisation), discourse analysts utilise manual annotation and automatic methods. For example, due to new technological advancements, academics now use more Natural Language Electronic Processing (NLP) tools for the automatic analysis of lexico-grammatical features present in large datasets produced by L1 and L2 writers (e.g., Fort et al., 2012; Lee, 2008; Scholman et al., 2016).

In that respect, researchers have witnessed a multidisciplinary effort in education, computer science, linguistics, psycholinguistics, cognitive psychology, corpus linguistics, and discourse processing for the development of new computer applications and research methods. Those developments have furthered the investigation of textual features such as the occurrence of cohesion items and cohesive relationships occurring in various text segments. (e.g., J. Allen, 1995; Biber, 1998; Biber et al., 1998; Field, 2004; Gabrial, 2009; Graesser et al., 2003; Kurdi, 2016; Pace-Sigge, 2013; Pace-Sigge & Patterson, 2017; Traxler & Gernsbacher, 2011).

For example, motivated to overcome the issues of using automatic text analysers and conventional techniques separately (e.g., readability formulas, Flesch–Kincaid Grade Level, Latent semantic analysis), McNamara, Louwerse et al., (2010) developed the computational linguistic tool Coh-Metrix. This single tool, for example, has enabled the analyses of textual features to help researchers understand better how receivers (i.e., readers and listeners) comprehend texts.

Along with acknowledging the particularities of cohesion elements occurring at the local level (i.e., between sentences) and global levels of texts (i.e., between paragraphs).

Similarly, Crossley et al., (2016b) and Crossley et al., (2019) developed the Tool for the Automatic Analysis of Cohesion (TAACO 2.0). This tool has advanced the measures presented in the Coh-Metrix tool. TAACO includes new and more indexes that claim the automatic analysis of cohesion in various segments of a text. That is the automatic analysis of word overlap between adjacent sentences and paragraphs, in a two-sentence and paragraph span, and connective words in the entire text.

Interestingly, both computer programmes share similar connectionist methods used in cognitive psychology as an attempt to model "neural networks which form the basis of the operations of the brain" (Field, 2004, p. 62). In that quest, these tools have sought to determine lexico-grammatical cohesion items (e.g., pronominals, conjunctions, collocations) by automatically measuring the frequency of words, means, and type-token ratios happening in a corpus (McEnery & Hardie, 2011).

Empirical evidence on the influence of using automatic analysis for measuring textual cohesion items has suggested that NLP tools may aid researchers to determine the use of specific textual linguistic features occurring in different parts of a text. That is lexical items that occur within and between sentences, between paragraphs, and the entire text (e.g., Crossley et al., 2016b, 2019; McNamara et al., 2014; McNamara, Louwerse et al., 2010a).

Empirical studies on cohesion at the sentence level, for example, show that NLP software could be used to determine the percentages and frequencies of various connective word types (e.g., conjunctions). At the paragraph level, automatic indices may be able to determine the number of interrelated parts of speech (e.g., repeated nouns, function words, and synonyms). Likewise, automatic tools could aid researchers to verify the overall cohesion of a text by automatically measuring the preceding textual discourse items. Such measures include determining the repetition of personal pronouns, as in the calculation of the ratio or proportion of pronouns to nouns in the whole text (P. McCarthy & Jarvis, 2010; McNamara et al., 2014).

Overall, although NLP tools still show limitations, empirical studies have signalled the importance of NLP tools for conducting automatic textual analysis. Hence, to address the research questions for this study, the TAACO tool has been selected to determine the extent of textual cohesion items in L2 writing; their relationships with teachers' judgements of quality (i.e., grades/scores); and their association with the various levels of proficiency (e.g., B2) as suggested by the CEFR guidelines for L2 writing instruction.

3.5.3 Cohesion Versus Coherence

Equally important as cohesion are the various relations of coherence which are present and constructed inside readers' minds to understand the main ideas in a text. A coherent text not only focuses on the propositions presented but to be coherent, a text must also include explicit and implicit cohesion cues and external factors such as the individual's reading ability (Crossley & McNamara, 2016c).

While cohesion relates to the consistency of elements that constitute a text, coherence relates to the consistency of those elements in the reader's mind (Louwerse et al., 2006).

Cohesion enables speakers to channel their propositions functionally by employing a variety of textual properties as using cohesive devices (e.g., referential words, conjunctions, and the repetition of lexical units) to link propositions between sentences, paragraphs and within the whole text. That purposeful channelling of propositions becomes the texture whereby a text becomes a coherent entity (Martin, 2001).

However, coherence is an elusive concept. Researchers may be aware of this fact, and instead of attempting to reach a consensus on *what* defines coherence, they have focused on *where* coherence occurs in a text (Connor, 1990; I. Lee, 2002; Roberts & Kreuz, 1993).

Advancements in coherence research have developed by studying theme and information (Halliday, 1994) as well as from the study of argumentative discourse structure (e.g., Lautamatti's topical structure analysis, 1978; Toulmin's model, 1958).

Nevertheless, understanding the relations of meaning that occur at the clause and sentence level was not central to Halliday and Hasan's (1976) work. Instead,

their work on cohesion acknowledged a set of lexicogrammatical elements to create various relations between clauses, groups of clauses (paragraphs), and the whole text.

That division may be essential to differentiating between cohesion and coherence. Not only Halliday and Hasan (1976) argued that cohesion is "the ONLY source of texture" (p. 9) but that cohesion, which enables language users to build relations of meaning, is the foundation of coherence (Halliday & Hasan, 1985; Hasan, 1984).

That position has triggered a debate among some academics, with a majority agreeing that a difference exists between cohesion and coherence, but with a significant disagreement on what differentiates between the two concepts (Tanskanen, 2006).

A source of dissent may be that cohesion is too text-oriented and ignores the involvement of the interactions occurring during the processing of information between the reader and the text. As described by some academics (e.g., Brown & Yule, 1983; Carrell, 1982; Connor, 1984) who see cohesion analysis itself of a text as inadequate, but through the relations of meaning provided by coherence which occurs in the mind of the receiver (e.g., readers and listeners).

However, although there may be a difference between cohesion and coherence, drawing a clear line between the two may be challenging. Whereas coherence appears related to the semantic interpretation of propositions presented in a text by the reader, cohesion is related more to writers' and speakers' selection of appropriate relations from a set of linguistic resources to produce less vague and more logical texts.

Hence, the relationship between cohesion and coherence is an intimate one. The relationship is also present during the online encoding and decoding of a written/spoken text, where writers/speakers could position themselves as listeners/readers of their text production.

This fine line of producing and processing a written text cohesively and coherently is illustrated by McNamara and Allen (2017):

> "Like reading comprehension, text production processes center around the use of linguistic information to actively construct meaning. Indeed, writing

incorporates many of the same processes inherent to reading, if only because we must read our own texts as we write." (p. 362).

3.6 First-Hand Research on Cohesion

Once the concept of cohesion has been scrutinised theoretically and is central to answering the proposed research questions, this part focuses on surveying empirical studies that have adopted cohesion as a target element for research.

In particular, this section surveys the various cohesion relations that occur in the production of written texts in educational contexts and whether specific cohesion relations contribute to the quality judgements of second language writing.

In mapping the evidence on cohesion as a key concept in empirical research on writing as a second language, a scoping literature review was undertaken to assist this thesis in clarifying the different conceptual boundaries on cohesion relations that occur in written texts (Arksey & O'Malley, 2005). The scoping literature review was selected to systematically survey the empirical studies undertaken on cohesion in writing in different contexts and, more precisely, in second language writing between the years 2009 and 2021. Similarly, the scoping literature review was the preliminary prior exercise to systematically review experimental, quasi-experimental, comparative, and correlational as well as qualitative empirical studies on grammatical and lexical cohesion in first and second language writing.

In reviewing empirical studies on grammatical cohesion, researchers have analysed the various semantical functions occurring in texts. Referential functions (i.e., pro-forms or phoric relations), for example, to refer to the previously mentioned idea (i.e., antecedents) involve studies on pronominals, attended and unattended demonstratives, the article 'the' and the use of comparatives.

3.6.1 Pronominals in L2 Writing of Various Language Backgrounds

The writer's ability to introduce participants (people, objects, concepts) by using appropriate endophoric references and co-text signals is supported by Whittaker et al. (2011). In a four-year longitudinal study in two secondary schools, they collected texts from L2 writers of Spanish background to determine the extent of development of textual cohesion and coherence in discipline-specific academic writing. Their findings suggest that the nominal group (e.g., nouns, adjectives,

adverbs) represents a semantical discourse resource for L2 writing, which may develop at different learning stages.

In characterising the nominal group in academic writing, the authors explain that nouns, prepositional phrases, and attributive adjectives constitute highly modified nominal groups that develop over time.

Even though identifying participants in the nominal group develops in later learning stages as anaphora increases in years three and four, the study is unclear about whether referential cohesion develops entirely because of L2 input. The study outcomes also fall short of fully indicating whether academic development in cohesion, which also occurs in the Spanish language and, over time, may contribute to referential cohesion in L2 writing.

Similarly, research on referential cohesion in other languages has attempted to determine whether the use of pronominals improves L2 writing narratives. Kang (2009), for example, carried out a mixed-methods study with Korean college-level participants. The author analysed distinct types of references, including the use of full-noun phrases, singular and plural pronouns, definite articles, demonstratives, and zero anaphora. The quantitative outcome suggests a positive cross-linguistic influence (i.e., the influence of the speaker's first language) on reference. The study also found some similarities in pronouns and definite referencing in Korean and English. However, although the findings contradict previous research on cross-linguistic influence on referential cohesion in L2 writing of Korean background, the qualitative section reveals that L2 writing differs in how English writers use phrases and pronouns.

In addition, Yang and Sun (2012) analyse and compare the use of cohesion in argumentative written texts in a corpus of second and fourth-year undergraduate Chinese EFL writers. Their study shows that second-year writers use more personal references and demonstrative pronouns than fourth-year writers. The authors point out that cohesion errors in students' writings vary in various categories, regardless of the writers' proficiency level. However, the study insufficiently explains whether common problems of cohesion occurring in groups of L2 students of different language backgrounds (i.e., intra-linguistic factors) determine the developmental issues in the overall ability to manipulate cohesion devices at distinct stages of L2 writing.

Likewise, in the analysis of cohesive devices in a small corpus of thirty academic essays by Thai undergraduates, Chanyoo (2018) reports that the use of references counted for almost a quarter of all cohesive types in the corpus, and the outcomes seemed to equate with the development of L1 writers of English. However, Chanyoo suggested that the use of cohesive devices in the study did not reflect the quality of the writing. Because the notion of reference occurs in all languages, the claim on reference development in L2 writing in Chanyoo's study may partly be explained by the participant's L1 cohesive development system.

3.6.2 Investigating the Role of Determiners

Empirical studies on determiners have surveyed the semantical function of demonstrative pronouns (e.g., this, that) to refer to something other than a nominal and explicit antecedent. Demonstrative pronouns allow the writer to include nouns or noun phrases along with the words this/these and that/those to express a referential relation in a text. In other words, although writing where demonstratives follow a noun or a noun phrase helps the reader easily decode what a demonstrative is referring to previously, the use of this strategy may be counterproductive since it may reduce the reading speed of more skilful readers (e.g., Crossley, Rose et al., 2017).

In this regard, Gray's (2010) study of journal research articles explains that the linguistic environment where the demonstratives 'this' and 'these' occur is key to creating cohesion in a text. While Gray's study attempts to identify the types of nouns that follow the demonstratives, the study outcomes suggest that mostly shell or abstract nouns refer to complete clauses or antecedents rather than shell nouns referring to extended pieces of discourse.

In another study, Rustipa (2015) analysed the differences between L2 graduate texts and advanced English writings in the use of 'this' as a demonstrative determiner and 'this' as a demonstrative pronoun. The study suggests that while a noun, a noun phrase, or a nominal group immediately follows the attended demonstrative determiner 'this', the unattended demonstrative pronoun either stands alone or is not immediately followed by a noun.

Particularly, Rustipa's study showed that L2 writing in Indonesia mostly uses attended demonstrative determiners. These findings explain that writers avoid using unattended demonstratives for a broader or less specific reference.

However, other researchers have found that the use of unattended demonstratives helps advanced readers quickly decode a text. Crossley, Rose, et al. (2017), for example, have also found that the presence of unattended demonstratives in texts also correlates with higher grades in written work.

3.6.3 Studies on the Definite Article 'The'

In comparing referential ties in EFL writing, scholars have reported the overuse, misuse, and underuse of the definite article 'the' among Persian participants. (e.g., Kargozari et al., 2012; Naderi et al., 2013). The findings of Naderi et al. (2013), for example, suggest that cross-linguistic differences (e.g., the absence of 'the' in Persian) may cause transferring issues. However, overuse and misuse also occur in the EFL writings of Chinese students, whose language does not possess nouns to represent the English article '*the'*.

The overuse and misuse of 'the' in EFL writing are also supported by other academics (Dong & Lan, 2010; Ong, 2011), who explain that Chinese EFL learners often unnecessarily use and misuse the definite article. However, although cross-linguistic differences in languages such as Chinese, Persian, and IsiZulu (Drummond, 2017) seem to cause transfer writing problems, intralingual and developmental factors appear to have a more significant role in the use of the definite article '*the*' in EFL writing.

3.6.4 The Use of Comparatives in L2 Writing.

Empirical studies on comparative and superlative types of referential ties in a text include items to signpost, contrast, and trace information more easily. Such items include numbers, adverbs, and adjectives in various degrees writers use. Nadova (2015) investigates the use of comparatives and the span of comparative phrases covering (i.e., the intervening sentences) in a text. For example, Nadova examined legal texts to explain that comparative referential ties connect remote sentences to link information more accurately. In her study, comparatives included 8.56 as the average number of intervening sentences.

In addition, although Saadat and Alavi (2018) explain that English writers use more referential relations (e.g., demonstratives and comparatives) than EFL Iranian writers at the college level, the study is unclear in explaining the extent of cross-linguistic influence. Likewise, Alavi and Masjedlou (2017) concur with Ong

(2011) on intra-linguistic and developmental difficulties in using comparatives by EFL writers of Persian and Chinese backgrounds.

3.6.5 Studies on Ellipsis and Substitution

Empirical studies on ellipsis and substitution cohesive resources to avoid the unnecessary repetition of previously referred lexical items include the analysis of explicit linguistic links. Such links include 'one' and 'ones' for nominal substitution; the auxiliary verbs 'do', 'does', and 'so' for verbal substitution; and zero substitution or ellipsis.

Because ellipsis and substitution are commonly used in fictional genres, newspaper articles and dialogues (Halliday, 1994), most studies surveyed for this thesis show scarcity of ellipsis and substitution use in L2 writings of different language backgrounds (Nadova, 2015; Oi, 2014; Saadat & Alavi, 2018; Yang & Sun, 2012).

However, in the analysis of Chinese college argumentative writings, Yang and Sun (2012) found that although ellipsis and substitution are sporadic, L2 writers have problems specifying a substitute/ellipsis item they refer to, as suggested in the following example (35).

> (35) "He thought that a birthday gift could make his wife happy. He decided to look for an appropriate gift. However, it was an unpleasant experience. He searched from shop to shop. But still he couldn't find an ideal one." (Yang & Sun, 2012, p. 36).

It is suggested that even though L2 writers manage to include cohesion by using the substitution word 'one', for some readers, the decoding of 'one' in the text may be complicated or unclear. The study indirectly shows that most college-level L2 writers know that substitution and ellipsis cohesion types are less commonly used in formal writing (Mohammed, 2015; Nadova, 2015). However, the study also indicated that the presence of ellipsis and substitution items have a weak correlation with suggested indices of writing quality.

Similarly, Oi (2014) compared the use of ellipsis and substitution items included in L2 writing by Japanese students. Oi found that while substitution and regular ellipses are not found in low-scored writings, middle-scored and high-scored writings did show some occurrences. These findings may also suggest that intra-linguistic and developmental factors rather than Japanese-English cross-

linguistic factors (Černáčková, 2017) influence L2 writing. In other words, regardless of language differences, better writers appear to use a more comprehensive set of linguistic resources such as ellipses and substitution, enabling them to better structure and connect ideas in texts.

3.6.6 Conjunction Use and Quality of L2 Writing

This section discusses the effect of using connectives in L2 writing with participants of different language backgrounds. It argues that developmental, intra-linguistic and cross-linguistic factors influence the frequency, position in a text, suitability of connectives in L2 writing and the factors of conjunction use that appear to shape the quality of texts. For example, in a study on the analysis of conjunctions in expository L2 essays of Spanish background at the secondary level, Lahuerta Martinez (2016) reports on the relationship between the frequency of conjunctions (i.e., conjunction density) and writing quality as well as the existing differences in the use of conjunction in participants enrolled in bilingual and a non-bilingual programmes.

By comparing the texts of these two L2 groups learning to write under different conditions, the study points out that developmental and intra-linguistic factors, rather than cross-linguistic factors, relate to problems in using specific conjunctions. Moreover, Lahuerta Martinez (2016) suggests that developmental issues may stem from L2 learners' ability to understand the functions of various types of conjunctions to be used in different parts of a text and conjunctions for specific text types and genres. However, although a relationship between conjunction density and the global score of texts occurs in the study, a closer examination of non-bilingual participants' texts shows problems using adversatives and additives in L2 writings of Spanish background. Other studies show a similar tendency of developmental, intra-linguistic, and to a lesser extent, cross-linguistic factors as the causes that may influence conjunction use in L2 writing (Jung Wan & Isaiah, 2011; Nugraheni, 2015; Yong-Yae, 2013).

In addition, the relation between conjunction use along with human judgements on writing quality has been investigated in a series of studies. Crossley and McNamara (2012a), for example, explain that more proficient L2 essays by secondary school students in Hong Kong produce writings with fewer positive logical connectors (e.g., and, also, next).

McNamara, Crossley, and P. McCarthy (2010) found similar results in analysing argumentative texts written by English language freshman participants. They found that connectives (such as because, therefore, so) aimed to facilitate reading comprehension were not related to essays deemed as of higher quality. Significant differences were also found in the use of negation connectives (e.g., not, no, neither, nor) and causal particles (e.g., because, since, so, then) in simplified texts (Crossley, Hae Sung, & McNamara, 2014).

In addition, in the analysis of descriptive L2 texts by university participants, Crossley et al. (2016a) found that the incidence of coordinating conjunctions (e.g., causal, contrastive, additive, logical, and temporal) was a negative predictor of organisation scores. However, some cohesion indices (e.g., the adjacent overlap between paragraphs of function words) are predictors of human judgements of text organisation and overall essay quality. The study did not find a relationship between cohesion growth and human judgements of writing proficiency, however.

Crossley et al. (2019) argued that local cohesion connectives are relevant because they link sentences, clauses, and phrases. In their analysis of L1 essays by first-year university students, local cohesion connectives did not correlate with human judgements of coherence. Instead, correlations were found with global cohesion between paragraphs, as well as cohesion at the level of the entire text correlated with teachers' judgements of essay quality. In contrast, Crossley and McNamara (2016c) showed that a combination of increasing elaboration of text content along with local and global cohesion measured by the density of connectives correlated with human judgements of text quality.

However, research outcomes are inconclusive on connectives in various parts of a text and their relationship to better writing skills in L1 and L2 participants (Connor, 1990; Crossley & McNamara, 2012b; McNamara et al., 2013).

Studies surveyed suggest that development is enhanced in English and L2 writers with access to better language skills training and improving their ability to use conjunctions. At the same time, although developmental and intra-linguistic research has focused on how L2 writers use conjunctions in their compositions, cross-linguistic research on cohesion has been scarce. That may be primarily due to the assumption of mainstream writing research that conjunction errors can

be fixed with the application of English language rules without any consideration of L2 transference.

3.7 Empirical Studies on Lexical Cohesion in L2 Writing

3.7.1 Studies on Reiteration in L1 and L2 Writing

Lexical cohesion on reiteration in L2 writing involves studies to understand better the effects of the systematic repetition of lexical items, which may contribute to the coherence of texts. Such studies involve using identical words (i.e., word repetition) or modified lexical forms (e.g., synonymic expressions, generalisations, contrasts).

In the automatic analysis of lexical differences related to cohesion and connectionist models to better distinguish between first language (L1) writers of English and second language (L2) writers of English of Spanish background, Crossley and McNamara (2009) found that college-level L1 and L2 written texts vary in several dimensions that link to the use of lexical choices.

Those dimensions correlate with the depth and breadth of vocabulary knowledge, word variation, and lexical sophistication. Crossley and McNamara's (2009) findings suggest that L2 writing shows a greater use of lexical repetition, less lexical variation, and less sophisticated vocabulary. As a result of these lexical differences, L2 products look more disengaged (lexically and semantically) than L1 texts. In addition, fewer vocabulary prospects in L2 writings prevent readers from furthering connections between lexical units.

Likewise, Crossley and McNamara (2011a) investigated cross-linguistic influences in high intermediate and advanced L2 writing of various L1s (e.g., Spanish, German, Finnish, and Czech). The linguistic features used to investigate intergroup homogeneity in L2 and L1 written texts included lexical sophistication, syntactic complexity, and cohesion indices.

Although the outcomes of their study show evidence for intergroup homogeneity in the linguistic patterns of L2 writers in those four word-based indices (hypernymy, polysemy, lexical diversity, and stem overlap), the differences in lexical cohesion items indicate that L2 writers show the production of less sophisticated vocabulary.

Additionally, they suggest that while L1 writers' conceptual organisation exploits a variety of word senses in frequent and infrequent vocabulary items, L2 writers generally possess a limited range of meanings per lexical item. In consequence, that may weaken the strength between connections of the senses of a word. For example, lower measures on hypernymy or words denoting a general meaning indicate that L2 writers produce more generalisable or less specific words when a hyponym or a more specific word is required. L2 writing also shows lower measures in polysemy indices or the presence of less ambiguous lexical units.

Moreover, the fluent morphological systems of L1 proficient writers enable them to produce words related to the level of the word stem or its lexical meaning (e.g., like = likely/unlikely, like/dislike). That ability allows them to rely less on lexical repetition, as it occurs in writers with an undeveloped morphological strategy in L2.

Research findings may counter the claim that repetition is a less helpful writing strategy than the use of recurring keywords in L1 texts of college-level participants as found by Crossley, Weston et al. (2011). However, the authors suggest that L1 writers focus more on global and overall cohesion than local cohesion cues such as word choice and lexical variety.

These findings can be related to another study that predicts L2 writing proficiency and the use of linguistic features. Crossley and McNamara (2012b) found that five variables (lexical diversity, word frequency, word meaningfulness, aspect repetition, and word familiarity) can predict the writing ability of L2 students at the secondary level. The results further suggest that L2 writers do not produce compositions with greater cohesiveness, but more linguistically sophisticated texts.

In addition, global cohesion (e.g., between paragraphs) and entire text cohesion (e.g., connective words) have been associated with the quality of texts by college-level students. In that respect, Guo et al. (2013) found that more proficient L2 writers relied less on local cohesion devices (e.g., content word overlap and conditional connectives occurring at the sentence level).

More recently, Crossley et al. (2019) found that L1 texts of adults positively correlated with global indices of cohesion (e.g., indices that calculate the

semantical overlap between the initial, middle, and final paragraphs) and negatively correlated between local cohesion devices and human judgements of coherence. However, the outcomes, as the authors suggest, may be linked to L1 younger writers as well as less proficient L2 writers, who may rely on local cohesion devices to create coherent texts such as word repetition, synonyms, and more explicit cohesion cues to organise their texts.

3.7.2 Collocational Use and Writers' Competence

Empirical research on collocation in L2 writing analyses the word associations that tend to occur regularly in the same lexical environment of a text (Halliday & Hasan, 1976). Aimed to determine its impact on L2 writing, the evaluation of collocation use seeks to estimate L1 and L2 cross-linguistic differences and indicate L2's competence and development. For example, in their analysis of the relationship between collocation knowledge to reading and writing skills in L2 college-level of Korean students, H. Kim and Bae (2012) found that although collocation knowledge is independent of the reading skills of more and less proficient L2 participants, collocation knowledge and use are significantly related to the writings of more proficient participants. While the authors suggest that emphasis on instruction of grammatical and lexical collocational types may have improved L2 writing, the study uses a small range of data that can be generalised to other L2 groups of different L1 backgrounds and at various stages of L2 development.

Similarly, following the study outcomes of Durrant and Schmitt (2009) that reported the differences in L1 and L2 writers' use of collocations, Demir (2018) surveyed a corpus of research articles written in English and published in various academic journals. The author suggests that while various combination types of collocations (e.g., verb + noun, verb + adverb/adjective, noun + verb; noun + noun) may aid in improving the cohesion in academic texts, the study outcomes found that the strategic avoidance of repeating high-frequency collocations along with including low-frequency ones may be a robust indicator of proficient writing.

In another study comparing collocational use in L1 (England) and L2 (Hong Kong) English writing in secondary schools, Fan (2009) reported that the performance of L2 participants of Cantonese background in collocational use might be adversely affected by cross-linguistic influence and intralingual and

developmental factors. The cross-linguistic influence could include collocations translated literally from Mandarin Chinese but not acceptable in English. Intralingual and developmental factors could include inadequacy in the use of lexis and grammar.

Likewise, Parkinson (2015) compared three groups (Mandarin, Spanish, and Tswana) of similar L2 proficiency to investigate the use of 'noun-noun' collocations in L2 academic writing in ESL and EFL contexts. The study findings show that the accuracy of 'noun-noun' phrases is significantly greater in the writing of ESL participants (i.e., Tswana group), while noun + noun phrases appear more frequently used by Chinese learners compared to the other two groups. This may suggest that cross-linguistic influence across three sub-corpora in the frequency of 'noun-noun' phrases in L2s of equal proficiency show that background language and context of learning may predispose writers to use a greater frequency of 'noun-noun' combinations.

Ong (2011) suggests that while determining the quality of L2 texts, the number of cohesive elements included in L2 texts makes them more cohesive or improves readability. Analysing its accuracy can help explain the common types of errors made by specific groups of L2 writers. In that respect, Ong analysed expository essays written by a group of 20 Chinese EFL college learners in Singapore. The study's outcomes indicate that the frequency of errors in the texts analysed included the repetition of the same word (63%) and collocational misuse (23%). The author suggests intralingual and developmental issues as the probable cause for the misuse of collocation. In other words, L2 learners may lack a range of vocabulary, and hence students may be unable to use other types of cohesive devices (e.g., synonyms as an alternative).

However, the study found that L2 writers face challenges beyond collocational phrases, pairs of words, or chains of words. The study indicates that collocational issues also occur across clauses or sentences in L2 texts.

Moreover, plenty of research using automatic analysers based on natural language processing tools has been conducted (Crossley & McNamara, 2012b; Graesser et al., 2004; McNamara et al., 2002). Such studies have sought to determine the degree of lexical cohesion and collocation in reading, text genres, and the quality of L2 writing.

In the automatic analysis of texts, Garner et al. (2019), for example, suggest that many utterances in languages such as English are composed of fixed or semi-fixed multi-word sequences. Such sequences involve collocations, idioms, lexical bundles, and n-grams. Words that co-occur in a wider range of multi-words or phrases of contiguous sequences have been categorised for analysis according to the number of items or grams (n-grams). For example, bigrams or pairs of consecutive written lexical units, trigrams, and 4-grams are examined to determine their frequency, range (i.e., variety), and association strength (i.e., the probability of occurrence) in a corpus of L2 writers of Korean background.

Although the outcomes of Garner et al. (2019) revealed that n-gram proportion and association strength measures were predictive of human judgements of L2 writing proficiency, only the higher-rated essays correlated with academic bigrams and frequent academic trigrams. These findings may suggest that second language instruction should emphasise the use of distinct types of collocations. For example, Demir (2018) maintains that L2 writing instruction should focus on using less and more frequent academic phrases and relevant collocations. In particular the use of collocations of various combinations (e.g., verb + noun, verb + adverb/adjective, noun + verb, adjective + noun, adverb + adjective, adverb + verb).

3.8 Chapter Summary

This section has attempted to provide a brief summary of the literature relating to cohesion theory and empirical research studies of cohesion features in texts composed by L1 and L2 writers. In that respect, a systematic literature review was conducted to synthesise the research approaches, methodologies, and techniques (e.g., corpus-based, manual annotation, and automatic tools) utilised by scholars for the analysis of lexico-grammatical cohesion features.

More importantly, this review of the literature aided in better formulating the research questions, expanding the knowledge on cohesion theory, checking similar research designs and research outcomes as well as identifying research gaps on cohesion in L2 writing. Particularly, this literature review aided this study to formulate better the research questions that could help find evidence on (a) the types of cohesion features occurring in text segments (e.g., sentences, paragraphs, and the entire text); (b) whether those cohesion features (e.g.,

reference, conjunction, reiteration) influence the teachers' judgements of writing quality; and (c) whether connective words (e.g., conjunctions) match the B2 CEFR writing standards.

Moreover, the studies surveyed indicate that Halliday and Hasan's theory has been widely used to analyse cohesion in texts while increasing interest in using corpora, automatic tools, and quantitative corpus linguistics methods were also evident in the review. The development of automatic indexes to analyse cohesion in texts has included the use of proxies that may resemble Halliday's theory. However, as noted by some scholars, NLP tools are not flawless, and their outcomes need to be interpreted with caution, as other dimensions also seem to influence writing.

Finally, studies conducted using automatic analysis of cohesion (e.g., Coh-Metrix, TAACO) suggest that they have been produced by a single group of researchers (e.g., Crossley, McNamara, Graesser), who have analysed texts produced mostly by undergraduates in L1 contexts. That element is crucial to consider because the literature indicates that few studies have explored the use of automatic tools (e.g., TAACO) in texts produced by L2 learners in EFL contexts (e.g., Ecuadorean schools). For example, the review shows that few studies have been conducted in EFL contexts (e.g., Latin-American countries), let alone on cohesion in L2 writing by Ecuadorean participants.

Methodology

4.1 Study Aims and Research Questions

Chapter Three presented theoretical and empirical studies of cohesion in second language writing. These studies, however, have seldom focused on undergraduates in Latin American countries. Hence, the current methodology has two goals. The first is to add to the existing literature on cohesion in L2 writing. The other is to examine the influence of cohesion features in language texts composed by students of English as a foreign language in Ecuador.

Particularly, the present methodology is conceived to address the main research question: What is the nature of cohesion in second language writing by undergraduates? To find answers to that question, the following specific research questions (RQs) are proposed:

(RQ1): What types of cohesion relations occur in L2 writing at the sentence, paragraph, and whole-text levels?

(RQ2): What is the relationship between cohesion features (e.g., grammatical and lexical) and teachers' judgements of writing quality?

(RQ3): Do expectations of cohesion by the CEFR match what is found in student writing?

4.1.1 Research Objectives

Considering the specific features in a population of second language students writing in English as a foreign language, this methodology aimed to analyse (i) how lexico-grammatical cohesion relations were used throughout a text (e.g., sentence, paragraph, and the entire text); (ii) which textual cohesion items were predictive of teachers' judgements of writing ability; and (iii) whether specific cohesion items (e.g., and, but, however) suggested by the CEFR standards were included in L2 writing.

Specifically, the research sought empirical data on (a) the frequency and types of cohesive devices (grammatical and lexical) in L2 writing; (b) correlations between cohesive relations (grammatical and lexical) and teachers' judgements (i.e., grades or scores) of writing quality in the corpus; (c) when correlations are found, whether they occur at the whole text or local levels (e.g., within and

between sentences, or between groups of clauses and paragraphs); and (d) whether cohesive relations in L2 writing comply with the corresponding cohesion descriptors (e.g., A1/2, B1/2, and C1/2), as recommended by the CEFR standards for the teaching, learning, and assessing of EFL in Ecuador.

4.2 Philosophical Stance

The present study adopted the paradigm of pragmatism to bring together various ontologies (i.e., the nature of reality and things), epistemologies (i.e., the ways of enquiring into the nature of reality and things), and research methodologies. Together, ontology and epistemology give rise to methodological considerations as in the practical choices for data collection and analysis (L. Cohen et al., 2018).

While maintaining an eclectic research position, a challenging part was acknowledging the differences underlying research theories. Pragmatism may utilise other paradigms (e.g., positivism, constructivism) to find answers to the research questions posed in this study.

One such example is the exploitation of the positivist paradigm. In positivism, ontology, epistemology, and research methods are heavily focused on objectivity, assessable facts, and observable data. Likewise, pragmatism may exploit interpretivist paradigms by relying less on objectivity and more on the individual's perspective. For example, an interpretivist worldview may adopt more personalised methods and strategies to obtain information (e.g., interviews, observations) or more in-depth data analysis procedures (e.g., discourse analysis, text analysis). In short, "Pragmatism uses simply what works. It can share concerns from positivism as well as from anti-positivism" (Goldkuhl, 2004, p. 14).

In that respect, Biesta (2010, p. 112) holds that pragmatists access knowledge by combining action and reflection. Pragmatists hold that reality changes continuously due to our actions. In pragmatism, the epistemological and ontological dichotomies are rejected, and the division between thoughts and things, consciousness, and content, and the mental and physical, become functional. Commenting on James (1997), Bernstein (2010) observed that "He is not denying that we make such distinctions, but they are functional and internal to 'pure experience'" (p.154).

Considering the practicalities of pragmatism as a research paradigm, this study embraces pragmatism to investigate cohesion in L2 writing. Consequences and meanings of actions and events are examined in terms of why research is done and why it is done in a given way (Morgan, 2014). Hence, following Dewey's (1985) steps to inquiry, this study:

- recognises cohesion in L2 writing as problematic,
- considers the influence of cohesion in the texts of college-level L2 writers in Ecuador,
- surveys cohesion in L2 writing to develop a line of action in response to the problem, and
- raises awareness to address the problem.

Moreover, a helpful example of pragmatism as a philosophy is found in the analysis of the research methodologies adopted by scholars for recognising a situation as problematic (e.g., cohesion in L2 writing). Some researchers, for example, have considered defining the problem and developing a possible line of action by undertaking experimental studies to control and manipulate cohesion relations in the development of L2 (e.g., Briesmaster & Etchegaray, 2017; Hui-Chin et al., 2011; MacArthur et al., 2018; Zoghipour & Nikou, 2016).

Others have used comparative and correlational approaches to analyse the types of cohesion features along with the relationship between specific cohesion items and writing ability defined primarily by teachers' judgements or scores (Crossley et al., 2016a; Duggleby et al., 2016; M. Kim et al., 2018; Kuzborska & Soden, 2018; McNamara et al., 2013; Wind et al., 2017).

Similarly, pragmatic researchers have complemented quantitative analyses and descriptions of cohesion relations with semi-structured interviews (e.g., Concha & Paratore, 2011; Fernandez & Siddiqui, 2017; Munoz-Luna, 2015; Rustipa, 2015).

In addition, researchers have combined automatic and manual analyses to investigate cohesion in texts. Such combinations have included the discrete analysis of referentials (Kang, 2009), connectives (Karahan, 2015), opposition relations (Kuzborska & Soden, 2018), conjunctions (Lahuerta Martinez, 2016; Mu

et al., 2015; Myung-Hye & Inhwan, 2016), collocations (Demir, 2018; Parkinson, 2015), as well as the automatic and manual analyses of grammatical and lexical cohesion devices included in separate studies (Ong, 2011; Yang & Sun, 2012; Yin, 2015).

4.3 Research Design

The methodology for this thesis comprises a corpus-based case study that examines lexical and grammatical cohesion relations in L2 writing by undergraduates studying English as a foreign language in Ecuador. Table 4.1 shows the elements considered in the research design.

Data Collected	Sample Size	Data Analysis
Essays and emails & Teachers' scores	480	Multi-Method Analysis

Table 4.1 – The Research Design

4.4 The Choice of a Corpus Study

A corpus-based approach allowed this study to identify, extract, and analyse lexico-grammatical features in electronically stored texts (e.g., Hasko, 2013; McKay, 2009). This approach facilitated the classification of various types of cohesion features in different text segments of collected texts. Corpus-based methodologies have widely been used by researchers in the empirical investigation of large data sets (Jamalzadeh & Biria, 2017; Kampakli, 2019; Tejada et al., 2015; Zarco-Tejada et al., 2016).

4.4.1 Building the Corpus

As discussed in the introduction of this thesis, most schools in Ecuador have adopted CEFR standards for the planning, teaching, learning, and assessing of English as a foreign language. Because the collected texts had to comply with specific language requirements, this was a key consideration in building the corpus. For example, in the two universities where data were collected, both included the CEFR linguistic standards for the production of L2 writing in their syllabi. Further, they organised second language instruction into levels or modules that may match those suggested by the CEFR standards. That is, texts

produced in each group were aimed to achieve the language needs of Basic Users (i.e., A1/A2 elementary), Independent Users (i.e., B1/B2 pre-intermediate and intermediate), and Proficient Users (i.e., C1/C2 advanced) (See Section 1.1).

However, relevant to this study, the collected texts complied with the language requirements at the B2 as suggested by the CEFR standards.

In building the corpus, texts were collected from undergraduates of Spanish language background. Aged mostly 18 to 24, these students were studying English as a compulsory subject. This group of writers was selected because most of them had previously studied English in primary and secondary school and likely have better-developed L1 linguistic abilities.

Relevant to this study, most students learned the English language following the CEFR standards and thus were familiar with writing various text types. The assumption was that more experienced L2 writers would produce longer texts with a greater diversity of linguistic elements, including multiple types of cohesion features (e.g., grammatical and lexical). Table 4.2 shows a summary of the collected texts.

Location	Number of Texts	Texts per Student	CEFR Level	Text Types
School 1	240	1	B2	Essays
School 2	240	1	B2	Emails

Table 4.2 – Data Collection Summary

In addition, at the B2 level, second-language writers are expected to compose formal essays (obligatory task), and an optional task that could include short stories, letters, emails, reports, and film and book reviews. However, for this study, only emails and essays were selected for analysis. These two types of texts seemed to comply with the linguistic requirements relevant to the inclusion criteria of the collected data.

In that respect, the key features considered in the inclusion criteria for pre-selecting the texts involved a minimum number of words (e.g., 140 words), higher grades (e.g., 5-10), as well as making decisions for keeping and discarding texts

that had too many grammatical and vocabulary mistakes (e.g., misspelling, too many words in Spanish).

Another critical step was ensuring that the pre-selected texts had punctuation marks (e.g., period, full stop, space) and that L2 writers employed those marks to divide their writing into sentences and paragraphs. Texts that included run-on sentences, such as texts with long sentences and missing punctuation, were removed, for example. Similarly, texts including a single paragraph and lacked punctuation were removed.

Moreover, a non-random scheme was considered to select texts and grades as suggested by Onwuegbuzie and Collins (2007). That is, only essays and emails corresponding to the B2 CEFR level were considered.

Low-scored texts with various issues (e.g., not enough words, spelling and grammar errors, run-on sentences) were also removed. For that reason, data collection focused on samples that earned higher scores (i.e., more than five points).

Text selection, ultimately, included: (a) one writing per student; (b) texts of at least 140 words as required for writing assessment at the B2 standard; and (c) emails and essays composed to fulfil the upper-intermediate levels (e.g., B2) suggested by the CEFR standards.

Furthermore, the collected texts came from writing tasks meant to assess students' performance in a formative and summative manner. On the one hand, the so-called formative texts came from written assignments with plenty of time to be completed, as in the case of essays collected in school one. On the other hand, compositions in school two were collected from end-of-term writing examination tasks and completed within a limited time framework. In that respect, although a variety of text types (e.g., reviews, reports, letters, emails) were collected from the summative task, the final corpus in school two indicated that emails were the most preferred types of texts by L2 writers.

Both types of texts were graded by experienced L2 educators who assigned grades on a 10-point scale based on customised rubrics for each writing task. (See the writing rubrics for the B2 level in Appendix I).

In that respect, writing prompts to assess students' writing ability at the B2 CEFR level were used by teachers to assess the L2 writer's performance. Examples of those prompts are presented in Table 4.3.

Text	Writing Prompt
Essay	Write an essay about the advantages and disadvantages of … Write an opinion essay about your personal …then write about…
Email	Your best friend and a group of friends are organising a trip to your country. Write an email…. Explain your decision advising on what to do during their visit. Write an email or letter asking for the information posted on a website about courses during summer in a school abroad.

Table 4.3 – Writing Prompts for the B2 Level

4.5 Data Analysis

4.5.1 Corpus Preparation

In preparing both datasets for analysis, handwritten texts (e.g., emails) were transcribed verbatim into "plain text" digital format (e.g., .txt). In addition, anonymisation procedures included removing personally identifiable information and replacing the student's name with a coded name for each text. Some demographic and survey data present in each collected text were added while renaming each writing. For example, a coded text (e.g., L1TTNarFS001Grade7.txt) would represent the **L**ocation (schools **1**, 2) from which the data was obtained, **T**ext **T**ype (**Email or Essays), S**tudent's gender (**M**ale, **F**emale), a number (**001**-720), and **Grade** (**5**-10). Further, including the author's basic information enabled the researcher to quickly identify the type, source, and grade received in each text.

4.5.2 The Corpus Analysis Tool: TAACO

The Tool for the Automatic Analysis of Cohesion, TAACO 2.0 (Crossley et al., 2016b, 2019) was utilised in this study for the analysis of cohesion features present in different segments of the collected texts. TAACO includes 168 TAACO indexes that claim the calculation of word repetition and semantical similarity (e.g., synonyms) occurring across sentences and paragraphs as well as indexes

to measure cohesion features in the whole text. More relevant, these computational measures have enabled academics to study cohesion features used by L1 and L2 writers (Crossley et al., 2016b, 2019; Muroi et al., 2021; Tywoniw & Crossley, 2019). Table 4.4 summarises the types of TAACO measures to analyse cohesion features.

TAACO Measures	**Number of Indexes at the:**		
	Sentence Level	Paragraph Level	Whole-Text Level
Word overlap	54	54	
Semantical similarity	8	8	
Connectives			25
Givenness			4
Lexical diversity			15

Table 4.4 – TAACO's Indices

The theory of cohesion discussed in the literature section emphasises the model outlined by Halliday and Hasan (1976). However, empirical research on cohesion shows that few NLP tools allow researchers to measure individual cohesion items and even fewer automatic tools measure multiple cohesion features. Such a limited number of software programmes containing a variety of indexes to measure cohesion features all at once have included the online-based Coh-Metrix (McNamara et al., 2014) and the downloadable TAACO tool (Crossley et al., 2016b, 2019).

Influenced by the development of Coh-Metrix, which aimed to evaluate the reading difficulty and text comprehension as well as cohesion features in texts, Crossley et al. (2019, 2016b) furthered the automatic analysis by developing new cohesion indexes in TAACO.

Yet although both tools seem to resemble the cohesion model set out by Halliday and Hasan (1976), Durrant et al. (2021) notice that these two models for analysing cohesion differ (i.e., Halliday's theory and NLP tools). Hence, the automatic outcomes of cohesion in texts by L2 writers need to be taken with caution.

4.6 TAACO's Indexes

4.6.1 Word Overlap Indexes

TAACO's word overlap indexes refer to how words and phrases overlap (i.e., repeat) across sentences and paragraphs (e.g., Graesser et al., 2004; McNamara & Graesser, 2012). Word overlap between text segments may result in greater cohesion and facilitate text comprehension (e.g., Crossley, Allen, & McNamara, 2014; Kintsch & Van Dijk, 1978).

In particular, adjacent *word overlap* indexes helped this study to analyse the relevance of content words (e.g., nouns, verbs, adjectives, adverbs), and function words (e.g., pronouns, prepositions, conjunctions, determiners) occurring between adjacent sentences and paragraphs, as well as their overlap in a two-sentence/paragraph span.

To analyse text segments, TAACO first lemmatises and tokenises content and function words to determine word overlapping. TAACO automatically groups the inflected or variant forms of the same word that occurs between sentences and between paragraphs. As in *is/are* can be lemmatised as *be*, worker*s* as worke*r*, determine*d* as determine.

In tokenising words, TAACO classifies words by counting the number of occurrences (i.e., tokens) in each group of the classification schema (called types) (e.g., Grisot, 2018; McEnery & Wilson, 1996).

Once each word category is lemmatised and tokenised, TAACO's word overlap indexes provide average outcomes that range from 0 to >1. The average outcomes may aid in describing the central tendency of unique words (i.e., word types) occurring between pairs of sentences or paragraphs.

In terms of cohesion, average scores may indicate the extent of overlapping of content and function words as in the average outcomes closer to zero, which may not only indicate less overlap in pairs of sentences and paragraphs but also a lower average outcome for adjacent word overlap may suggest a low-cohesion text. A summary of the six types of lexical overlap measures for sentences and *six* types for paragraphs, each measure calculating the presence of *nine* content and function words, is presented in Table 4.5. The table summarises the 54

TAACO indexes developed by Crossley et al., (2016b) to determine adjacent word overlap in sentences plus fifty-four indexes for paragraphs.

Indexes	Items
Overlap of content and function words (listed on the right column) occurring with the following sentence/paragraph. Overlap of content and function words but considering the number of sentences/paragraphs (i.e., normed). Overlap of content and function words but include any overlapping item with the following sentence/ paragraph (i.e., binary).	All lemmas Content word lemmas Function word lemmas Nouns Verbs Adjectives Adverbs Pronouns Argument: noun and pronoun
Overlap of content and function words overlapping with the following *two* sentences/paragraphs. Overlap of content and function words with the following *two* sentences/paragraphs but considering the number of sentences/paragraphs (i.e., normed). Overlap of content and function words but include any overlapping item with the following *two* sentences/paragraphs (i.e., binary).	

Table 4.5 – Lexical Overlap Indexes

4.6.2 Semantical Similarity Indexes

In the analysis of lexical features, some academics have proposed the use of semantical similarity measures to help researchers determine the hidden meaning of words in written texts. (e.g., Landauer et al., 1998, 2007; McNamara et al., 2007).

Following that tendency, TAACO includes *sixteen* semantic similarity indexes that may help investigate the hidden meaning of words in sentences and paragraphs of a text. For example, to assess the semantical similarities in L1 and L2 writing, TAACO includes indexes claiming the calculation of the similarity of word meanings between adjacent progressive segments (e.g., sentences or paragraphs). Such indexes measured *synonym overlap* of nouns and verbs, latent semantic analysis (LSA), *cosine similarity*, *latent Dirichlet allocation* (LDA), and the *Word2vec* analysis model.

Synonym overlap included *four* indexes that calculate the average of synonym overlap of nouns and verbs occurring in sentences and paragraphs. To determine the synonymy outcomes, TAACO relies on WordNet, an electronic vocabulary

database developed by Fellbaum (1998a), which according to Landauer et al. (2007), may help describe “the human mental lexicon” (p. 90).

Based on that assumption, four indexes provide average outcomes (e.g., 0 to >1), which may determine the impact of synonym overlapping of nouns and verbs between sentences and between paragraphs. The resulting figures may be helpful for a better understanding of whether verb and noun synonyms occur between sentences, or whether they occur between paragraphs. For example, suppose outcomes on overlap synonyms between paragraphs were closer to zero. In that case, they may indicate that a text contains few noun and verb synonyms, making it a less cohesive text.

In addition, TAACO includes indexes that stem from the Latent Semantic Analysis (LSA) technique for automatically processing and analysing semantic similarity in L2 writing. In TAACO, LSA indexes aim to determine “the degree to which adjacent sentences in the text are conceptually similar” (Lu, 2014, p. 162). The application of LSA as a method for analysing large databases can yield insight into human cognition (Landauer et al., 1998). By using the LSA cosine similarity, TAACO measures the similarity of terms (i.e., words) and documents (i.e., sentences, and paragraphs) in the collected data. TAACO includes four indexes that deliver the LSA cosine average to help determine the impact of lexical semantic similarity of words in adjacent sentences/paragraphs and in a two-sentence / paragraph span. The LSA cosine results may be helpful in the analysis of semantic similarity of lexical cohesion features occurring between sentences or between paragraphs.

Moreover, following the LSA technique for finding out the latent meaning of words in documents (e.g., sentences, paragraphs), TAACO uses four indexes based on the Latent Dirichlet Analysis (LDA) method developed by Blei et al., (2003). The LDA method holds that because documents exhibit multiple topics, a hidden semantic structure in writing can be described by the distribution of the topics in a corpus. In LDA, each topic can be explained by a distribution of all the observed words in the corpus. A word in a document is likely to belong to the same topic as the other words in that document. For example, suppose a topic is formally defined as a distribution over a fixed vocabulary. In that case, the topic of

Information Technology will include words about technology with a high probability of occurring in sentences or paragraphs of a document (Blei, 2012).

Similarly, relevant to this study, the LDA method may help analyse the likeliness of words belonging to the same topic in a text and whether it occurs in sentences or paragraphs of the collected data. Such TAACO LDA indexes provide average results on words and their topics occurring in adjacent pairs of sentences and paragraphs and a two-sentence/paragraph span.

Index	Outcome	Number of Indexes
Synonym overlap	Average of noun and verb synonyms in sentences and paragraphs.	4
Latent semantic analysis	Average of cosine similarity in all adjacent sentences/paragraphs and with a two-sentence/paragraph span.	4
Latent Dirichlet analysis	Average of allocation divergence score between all adjacent sentences/paragraphs and with a two-sentence/paragraph span.	4
Word2vec	Average word2vec similarity score between all adjacent sentences/paragraphs and with a two-sentence/paragraph span.	4

Table 4.6 – Semantical Similarity Indexes

Finally, TAACO includes the *word2vec* index as a word representation model to automatically categorise words with similar meanings occurring in sentences and paragraphs (Mikolov et al., 2013). Like the previous LSA and LDA measures, word2vec indexes calculate semantical similarity scores between all adjacent sentences/paragraphs and the average similarity score with a two-sentence/paragraph span. For example, in a study examining the effects of cohesion features and enhanced cohesion on expert ratings, Crossley et al. (2016b) found that global (i.e., paragraph level) semantical similarity was a key predictor of coherence ratings by word2vec. A summary of all TAACO semantical similarity indexes is presented in Table 4.6 above.

4.6.3 Whole-Text Indexes

TAACO includes connective words, givenness, and lexical diversity indexes to measure cohesion across the text. Contrary to comparing cohesion features

between sentences and paragraphs, these three groups of indexes attempt to determine the incidence of cohesion features in the entire text. A summary of whole-text indexes developed by Crossley et al. (2016b), is presented in Table 4.7.

Connectives Indices	Lexical Diversity
basic connectives conjunctions disjunctions lexical subordinators coordinating conjuncts addition sentence linking order reason and purpose all causal connectives positive causal connectives opposition determiners demonstratives attended demonstratives unattended demonstratives all additive connectives all logical connectives positive logical connectives negative logical connectives temporal connectives positive intentional connectives all positive connectives all negative connectives all connectives	lemma TTR lemma MATTR lexical density (tokens) lexical density (types) content lemma TTR function lemma TTR function word MATTR noun lemma TTR verb lemma TTR adjective lemma TTR adverb lemma TTR pronoun lemma TTR argument lemma TTR bigram lemma TTR trigram lemma TTR
	Givenness
	pronoun density pronoun to noun ratio repeated content lemmas repeated content lemmas and pronouns.

Table 4.7 – Indexes to Measure Cohesion in the Entire Text

The first group encompasses connectives indexes. Connectives may be relevant for analysing cohesive links between ideas and clauses and may provide clues about text organisation (McNamara et al., 2014).

Based on taxonomies developed by Halliday and Hasan (1976) and Louwerse (2001), TAACO includes a selection of connectives lists. Even though a detailed inventory of all connectives is included in the TAACO manual developed by Crossley et al., (2016b), the meaning of different connectives and their classification is not widely agreed upon. Such lists include positive and negative connectives (e.g., also/moreover vs however/but), positive and negative temporal connectives (e.g., after/before vs until), and positive causal connectives (e.g., because, hence).

Other lists involved common connective words (e.g., for, and, nor, but, or, yet, so) labelled as basic connectives, opposition connectives (e.g., however, but, yet), conjunctions (e.g., and, but), time order words that signal the order in which events happen (e.g., first, then, next), positive and negative logical connectives (e.g., actually vs admittedly), demonstratives preceded or not by a noun phrase labelled as attended (e.g., That new bike is mine) and unattended (e.g., That is mine (e.g., Crossley, Rose, et al., 2017).

More relevant to this study, TAACO's connectives indexes may aid in searching for evidence on whether connective words influence cohesion across the text and whether L2 writers in the collected texts utilise specific cohesive items (e.g., and, but, however) that match the CEFR standards.

Givenness is another group of indexes included by TAACO. In the analysis of the entire text, the notion of givenness is associated with 'given' (i.e., 'known' or 'old') information as opposed to 'new' ('unknown') information and how these two types of information are distributed in all sentences of a text. The analysis of givenness may be helpful to elucidate how writers generally place given before new information, aiding readers to comprehend better how each new piece of information fits into what readers already know.

However, although little consensus has been reached on how to define givenness (e.g., Allerton, 1978; Halliday, 1967; Prince, 1981; Seoane, 2012), TAACO's developers maintain that "givenness is an important element for measuring cohesion and reflects the amount of information that is recoverable from the preceding discourse" (Crossley et al., 2016a, p. 7).

Similarly, Crossley et al. (2016a) noticed that "a greater number of pronouns and demonstratives are used when information is given" and givenness can be assessed "with the presumption that a greater ratio of pronouns will relate to more given information" (pp. 7-8).

Such givenness approximations included the average calculation of pronoun (e.g., third person) density, the ratio of third-person pronouns to nouns, repeated content lemmas, and the number of repeated content words and third-person pronouns occurring in the entire text. Once TAACO analyses givenness in the

entire text, the average outcomes (e.g., 0 to 1>) could help to better distinguish between low versus high cohesion versions of a text.

Together with connective and givenness indexes, TAACO includes lexical diversity measures to determine the variety of vocabulary in the entire text. Unlike indexes that analyse lexical items (e.g., word repetition and synonyms) occurring between sentences and paragraphs, lexical diversity indexes assess the variety of words used by writers in the whole text.

In that respect, a common measure of lexical diversity included in TAACO is the type/token ratio (TTR) (Templin, 1957), which calculates the number of unique words (i.e., types) divided by the overall number of different words (i.e., tokens) of a text. If a text, for example, has fifteen types and twenty tokens, the TTR will be .75.

That outcome may suggest that the closer the TTR ratio to one, the greater the lexical richness of the segment. However, a text with more words and tokens would alter the TTR outcomes.

Therefore, in an attempt to circumvent issues of text length, that is, larger samples of word tokens will give a lower TTR score, TAACO also includes the moving average type/token ratio (MATTR) with a 50-word window length (Covington & McFall, 2010; Köhler & Galle, 1993).

By selecting a window length of fifty words, TAACO calculates the TTR for words 1–50, then for words 2– 51, then 3–52, and so on to the end of a text. In that respect, Covington and McFall (2010) assert that:

> "The mean of all these TTRs is a measure of the lexical diversity of the entire text and is not affected by text length nor by any statistical assumptions" (p.96).

Finally, regarding cohesion, the TTR and MATTR outcomes (e.g., high vs low lexical diversity) may help this study to determine whether L2 texts include lower lexical diversity —as in more words were repeated multiple times across the text— the inclusion of more frequently used words would suggest a higher cohesion in a text. On the contrary, a less cohesive text may be highly lexically diverse if the writer uses many different words with little word repetition. However, because high lexical diversity is likely to correlate with low-frequency words,

those outcomes need to be taken with caution, as diversity may not be equated with cohesion.

4.6.4 Important Considerations While Using NLP Tools

Natural language processing tools allow computers to perform human language tasks. NLP tools now facilitate human-machine communication, improving human-human communication, and manipulating or extracting vast amounts of data from stored files (Jurafsky & Martin, 2009).

As discussed earlier, in triggering those language processing systems, a multidisciplinary effort has been necessary. Such collaboration may include knowledge about artificial intelligence, cognitive science, psychology, computer science, education, and linguistics. Linguistic or language knowledge about grammar, lexis, morphology, semantics, pragmatics, and discourse, for example, has enabled researchers and commercial technologies to develop automatic speech recognition and natural language generation NLP tools and applications. Such developments have included automatic dictation, text-to-speech, automatic language translation, and corpus text processing tools.

Relevant to this study, NLP automated text analysers utilised to search through large volumes of text data have permitted the identification, extraction, quantification, visualisation, and management of linguistic features. Consequently, the benefits of robust analytical NLP tools cannot be overestimated, as Lu Lu (2014) asserts:

> "…it has become increasingly easier to use large sets of text samples to investigate the relationships and interactions between different linguistic features and how these relationships and interactions may vary as a function of different linguistic and sociolinguistic factors" (p. 177).

Coh-Metrix and TAACO are two relevant examples of NLP tools for text analysis. For example, Graesser et al. (2004) developed Coh-Metrix to investigate the role of cohesive features and linguistic sophistication in texts (e.g., Crossley, Hae Sung et al., 2014; Crossley, Roscoe et al., 2014; Elgort, 2017; Guo et al., 2013; MacArthur et al., 2018; McNamara, Louwerse et al., 2010).

Like Coh-Metrix, TAACO supports the investigation of cohesion features in L1 and L2 writing. However, TAACO has included new indexes to investigate local

and global cohesion features, synonyms, and measures based on latent semantical measures (e.g., LDA, word2vec) described previously.

Researchers have recently utilised TAACO (a) to analyse the development and use of cohesive devices in L2 writing and their relations to judgements of essay quality; (e.g., Crossley et al., 2016a; Ryu, 2020); (b) to investigate local versus global cohesion features (e.g., Crossley & McNamara, 2016c); (c) to determine the semantic similarity in texts (Crossley et al., 2019); (d) the relationship between cohesion features and L2 writing quality (e.g., M. Kim & Crossley, 2018); and to investigate (e) the use of givenness and connectives in written texts (e.g., Chung & Kim, 2020; Taylor et al., 2018).

However, while facilitating researchers to determine diverse types of linguistic information in large datasets automatically, NLP systems face challenges linked to reliability issues, full functionality, and public availability (Lu, 2014).

Similarly, academics interested in NLP tools may concur that most NLP methods (e.g., latent semantic analysis, machine learning algorithms, regression techniques) are prone to error. Coh-Metrix and TAACO are not exemptions. Consequently, their outcomes need to be taken with caution. As Crossley et al. (2016b), the developers of TAACO themselves warn researchers:

> "While we have measured a number of cohesive devices, there may be cohesive devices we did not calculate and some of our calculations may only tap into cohesion, but not fully measure it." (p. 14).

Furthermore, Crossley et al. (2016b) conceive cohesion differently. Or at least the types of 'cohesion' they measure are often not the same things that linguists have had in mind when they talk about cohesion (e.g., Halliday & Hasan, 1976; Halliday & Matthiessen, 2013). In that respect, Marcus (2018) warns that in the process of developing NLP tools, "prior knowledge is often deliberately minimized" (pp. 10-11).

Despite those issues, it may be possible to draw parallels between TAACO indexes and theoretical classifications on cohesion, as described in the seminal book on Cohesion in English by Halliday and Hasan (1976). Such parallels may include comparing TAACO's indexes and lexico-grammatical theoretical models (e.g., pronominals, connectives, and lexical items), which occur in specific text segments (e.g., sentences and paragraphs). Some NLP advocates (e.g.,

Crossley, Allen, Kyle, & McNamara, 2014) even maintain that pronominal indices "can be used as a proxy for anaphoric use, because their instances presume there is a previous anaphoric referent" (p. 519).

Moreover, empirical research outcomes based on TAACO may suggest that cohesion occurs in short and mostly in longer text segments. That may be relevant to mention because while the theory on cohesion by Halliday seems mostly absent in TAACO, empirical outcomes may draw some parallels with the theory on cohesion developed by Halliday and Hasan (1976). That is, both the automatic tool and the theory concur that cohesion mainly occurs in larger text segments (i.e., between paragraphs) rather than within and between sentences (Crossley et al., 2019).

However, to identify text segments, TAACO requires that sentences and paragraphs be adequately positioned. In other words, TAACO indexes require punctuation to work. In achieving that, the user must prepare the corpus in advance by checking that each text does not include unnecessary spaces between sentences and line spaces between paragraphs.

Unfortunately, while overlooking this step may lead to inaccurate measures by TAACO, the risk of excessive manipulation of data could lead to misleading outcomes or affect the outcomes if the study is later replicated.

More relevant, TAACO incorporates a set of word overlap indexes enabling this study to identify the repetition of lexico-grammatical cohesion features occurring between text segments. Such features include the repetition of pronouns (e.g., first-, second-, and third-person pronouns) occurring between sentences and between paragraphs. But, like in the Halliday and Hasan tradition (1976), the TAACO tool seems to overlook the analysis of cohesion features present within sentences (i.e., between clauses).

Investigating clause relations with one another (e.g., taxis and logico-semantics) may be key when investigating the development and nature of cohesion in L2 writing (e.g., Ngongo, 2018; Nguyen & Quynh, 2020). However, while some scholars have held reservations against omitting intra-sentence cohesion features (e.g., Butler, 2003; Martin, 1992; Schiffrin, 1987), others (e.g., Hoey, 1991; Verschueren, 1999; Xi, 2010) have aligned themselves with Halliday and

Hasan (1976), who emphasise that cohesion at the intra-sentence level is less noticeable “because of the cohesive strength of grammatical structure; since the sentence hangs together already, the cohesion is not needed in order to make it hang together” (p. 8).

Despite the support for only considering inter-sentence cohesion (Xi, 2010), it is worth mentioning that there are unresolved issues involving the automatic analysis of cohesion within sentences in L2 writing.

In particular, the automatic analyser TAACO, programmed to analyse inter-sentence/paragraph cohesion features, may fall short to determine the accuracy of intra-sentence cohesive relations occurring across texts.

That is, while automatic indexes may be capable to identify and count textual features (i.e., parts of speech) between sentences and paragraphs, those indexes may not fully identify all cohesion types underlying cohesion relations. Such limitations may include the identification of anaphora and cataphora relations; the multifunction of connective words that may not only function as cohesive devices (e.g., conjunctions) but also as adverbs and prepositions, which also occur between clauses.

Case in point, in the automatic analysis of “the students wrote some emails, and then wrote some essays”, the automatic analyser overlooks the internal cohesion of that sentence. More crucial, if intra-sentence cohesion features present in texts are faulty, the scores provided by the NLP tool may fall short of fully describing the nature of cohesion by L2 writers.

This situation may not be different from other NLP methods that show similar limitations in making inferences. As Marcus and Davis (2019) notice about deep learning methods that attempt to imitate the mechanisms of the human brain for processing data:

> “deep learning struggles when it comes to understanding how objects like sentences relate to their parts (like words and phrases)…Virtually every sentence that we encounter requires that we make inferences about how a broad range of background knowledge interrelates with what we read.” (Marcus & Davis, 2019, pp. 80-82).

Additionally, TAACO seems limited in distinguishing the different uses of connectives in a text. While TAACO determines the incidence of all connective

words in a text, not all cohesive devices occurring at the sentence level may contribute to text cohesion. That is at least what Halliday suggests about the dual understanding of connectives or conjunction words (e.g., *and*, *but*, *or*, *however*) occurring at the sentence level as well as connective words between paragraphs.

According to Halliday's theory, connective words contribute to the cohesion of a text when they occur in larger stretches rather than when used at the local level of a text. In other words, the use of connectives at the sentence level may not contribute to text cohesion as much as connectives being used at the beginning of larger stretches (i.e., between sentences and between paragraphs) of a text.

TAACO, which bases its connectives indexes on Halliday's theory, fails to make those distinctions. TAACO lacks a widget that can help differentiate the use of connectives, that is, identifying the use of connectives occurring between sentences and between paragraphs. Instead, TAACO aids researchers in determining the incidence of connectives in the entire text.

Moreover, TAACO includes semantical measures based on LSA statistical methods that aided this study in determining the lexical relations occurring between sentences and paragraphs. However, like all TAACO indexes, the outcomes need to be taken with caution because LSA statistical methods "are forced to use a variety of proxies that are ultimately inadequate" (Marcus & Davis, 2019, p. 132). TAACO, for example, uses those proxies (e.g., Word2Vec measures), which may be somewhat successful at analysing vocabulary; however, as Marcus and Davis (2019) emphasise, "For all the hype, the reality is that Word2Vec doesn't grasp even basic notions like opposites." (p. 132).

With those limitations in mind, TAACO aided this study in analysing the lexico-grammatical resources that may enable L2 writers to express their propositions in a text. However, since there is no automatic tool that accurately analyses cohesion's influence in texts, TAACO outcomes were taken judiciously.

Furthermore, other factors may be necessary to include to better understand the impact of cohesion in L2 writing (e.g., the writer's age, writing experience, and L2 proficiency). In that respect, Graesser and McNamara (2011) notice that "computers cannot identify and scale texts on all levels of language, discourse, and meaning" (p. 223).

In an attempt to handle those limitations, the salient outcomes obtained by using TAACO were compared with other studies that included automatic analysers for cohesion analysis (e.g., McNamara, Louwerse, et al., 2010).

In the end, TAACO indexes aided in answering the posed questions for this study. As to better comprehend the nature of cohesion in L2 writing by determining the cohesion relations that occur in text segments and their correlation with writing quality, and whether specific connectors (e.g., and, but, however) match the CEFR standard specifications for L2 writing.

4.7 Statistical Analysis Approach

In the quest to find out the relationship between textual features and their influence on the quality of texts, the literature on cohesion shows that correlational, regression and principal component analysis have aided researchers in analysing texts statistically (e.g., Crossley, Kyle et al., 2014; Graesser, McNamara et al., 2011; McNamara, Crossley et al., 2010; Qin & Uccelli, 2016).

Following a similar approach, this study conducted statistical analyses to find answers to the research questions. Descriptive and inferential statistics aided this study in making sense of quantitative information (e.g., Brezina, 2018; Larson-Hall, 2015; Mertler, 2018). In particular, the statistical analysis included the processing of L2 writing through specialised software (e.g., TAACO); the corpus tool provided the linguistics variables and scores in a spreadsheet that were ultimately analysed using the SPSS Version 28.0. (IBM Corp., 2021) statistical software. Figure 4.8 shows the selected analysis process for this study.

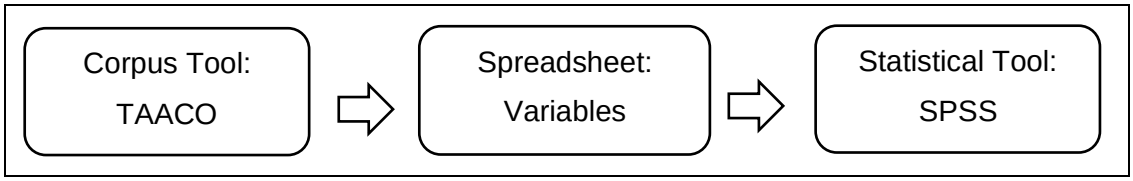


Figure 4.8 – Statistical Analysis Process (Adapted from Brezina, 2018)

4.7.1 Common Assumptions

In order to conduct the statistical analysis, certain characteristics needed to be assumed. Such assumptions, described in previous studies on cohesion (e.g., Crossley & McNamara, 2012b; Guo et al., 2013), have included checking

normality, linearity, homoscedasticity, as well as preventing issues of collinearity, multicollinearity, and redundancy (e.g., Alin, 2010).

Variables were visually and numerically scrutinised through descriptive statistics. The visual analysis included checking normal distribution in boxplots, scatterplots, Q-Q plots, and histograms. The visual assessment enabled the detection of values that extensively differ from other values (i.e., outliers).

Numerically, the analysis included checking the normal distribution of the data by inspecting skewness and kurtosis appropriate levels, Kolmogorov-Smirnov, and Shapiro-Wilk tests of normality, and checking the standard deviations of the data provided by the Mahalanobis (1936) distance levels. For example, this study considered the values for positive and negative skewness and kurtosis between −2 and +2 to indicate univariate normal distribution (George & Mallery, 2010). In addition, multicollinearity between indices (defined as r> 0.70) was checked to avoid the measuring of similar features (e.g., L. Cohen et al., 2018; Larson-Hall, 2015).

Additional assumptions included conducting a reliability analysis to check the instrument's validity and suitability and removing items with low reliability. In that respect, Cronbach's alpha statistic provides a coefficient of inter-item correlations that can lie between 0 and 1. That coefficient enabled checking the internal consistency of scores obtained from TAACO indexes and the dependent variable (e.g., L. Cohen et al., 2018; Tavakol & Dennick, 2011). For instance, using the SPSS 28 statistical tool, the email group showed a Cronbach's alpha of 0.885 and the essay group 0.946, suggesting that the data were suitable for further data exploration.

4.7.2 Correlational Analysis

Pearson product-moment correlations aided this study in determining which variables most highly correlated between TAACOs' textual features and teachers' judgements of writing quality (e.g., Crossley et al., 2016a; Taylor et al., 2018). For example, the co-occurrence strength (e.g., -1 and +1) between two variables was also determined using the SPSS 28 statistical software. Additionally, relevant to this study, Pearson correlations enabled us to determine which cohesion variables occurring at the sentence, paragraph, and whole-text levels most highly correlated with the grades (e.g., Crossley et al., 2016b; M. Kim & Crossley, 2018).

Correlational tests have aided researchers in making decisions about courses of action on which correlations were the most salient, had a negative correlation or lacked a relationship with cohesion features (e.g., Crossley et al., 2011; McNamara, Crossley, et al., 2010; McNamara, Louwerse, et al., 2010; Witte & Faigley, 1981).

Other researchers have utilised correlational tests to determine writing quality with pronouns (e.g., MacArthur et al., 2018), demonstratives (e.g., Yang & Sun, 2012), connectives (e.g., Crossley, Rose, et al., 2017; Lahuerta Martinez, 2016; Plakans & Gebril, 2017) as well as word repetition correlations found in semantical similarity scores (e.g., Elgort, 2017; Guo et al., 2013), and word overlap occurring between sentences and paragraphs (e.g., Crossley & McNamara, 2011a).

Finally, while correlational tests have aided in determining the relationships between variables, Egbert (2017) cautions against misinterpreting correlational outcomes, “especially when many variables are being measured simultaneously” (p. 562).

4.7.3 Principal Component Analysis

A principal component analysis (PCA) was conducted to extract a reduced set of factors or components from a set of significantly correlated variables. The PCA statistical method has enabled researchers to reduce the number of factors into a more manageable and meaningful set of components (Ringnér, 2008). This study reduced the number of variables following the PCA steps and stages described by Brezina (2018) and L. Cohen et al. (2018). Such procedures included checking the suitability or “safety checks” on the data (e.g., number of variables, sampling adequacy, meeting assumptions), identifying relevant variables, extracting factors from multiple variables, and the functional interpretation of factors as dimensions.

More specifically and like previous studies on cohesion, this study conducted a PCA to reduce a large number of variables (e.g., 168) for emails and essays datasets to a small number of functional dimensions (e.g., Graesser et al., 2011). For example, TAACO measures and PCA outcomes intersected with nine principal components for essays and seven components in essays.

In the interpretation of the PCA results, Cohen et al. (2018) suggest two main types of rotation, that is, determining the strongest correlations between variables and the latent factor for building factors: direct oblimin rotation (i.e., oblique, correlated) or varimax rotation (i.e., orthogonal, uncorrelated) (e.g., Osborne, 2015). While the first type of rotation is used if there may be correlations between the factors, the varimax rotation is used when the researcher assumes that factors are not correlated. Hence, after checking the data were free of multicollinearity, the PCA for this study assumed an orthogonal loading of components.

In addition, the PCA method has furthered the analysis of cohesion (Crossley et al., 2015; Graesser et al., 2011; Louwerse et al., 2004). For example, Crossley et al. (2015) conducted a PCA using indexes reported by NLP tools to examine the co-occurrence of indexes. By developing principal component scores, Crossley et al. tested those scores using a regression model to predict which cohesion features influenced human judgements of essay quality.

In this study, the set of large number of linguistic variables (168) was reduced to a more practicable set of scores in essays and emails. These two sets of factors were then used as predictors in a stepwise multiple regression analysis as reported by other studies (e.g., L. K. Allen et al., 2015; Bulté & Housen, 2014; Zoltán, 2013)

4.7.4 Linear Regression.

Similarly, a stepwise linear regression was conducted to examine the components reported by PCA. The stepwise regression test that involved including or removing latent explanatory variables aided in identifying predictive variables relevant to answering the research questions (e.g., J. Cohen et al., 2013).

More specifically, by sifting through potential independent variables, the stepwise regression test assisted this study in explaining better the most relevant predictors occurring at the sentence, paragraph, and whole-text levels and whether the expectations on cohesion by the CEFR match the L2 writing data.

Other researchers have relied on using regression models to determine the influence of the dependent variable (e.g., teachers' judgements of quality),

uncover latent correlations that were ignored, and how selected correlations seemed to influence each other (McNamara et al., 2013, 2015; Qin & Uccelli, 2016).

4.8 Issues of Validity, Reliability, and Generalisability

To enhance the accuracy of the instruments to analyse data, validity, and reliability issues were addressed in this study. In that respect, Tavakol and Dennick (2011) hold that:

> "Validity is concerned with the extent to which an instrument measures what it is intended to measure. Reliability is concerned with the ability of an instrument to measure consistently. It should be noted that the reliability of an instrument is closely associated with its validity. An instrument cannot be valid unless it is reliable. However, the reliability of an instrument does not depend on its validity." (p. 53).

Particularly, they maintain that reliability can be measured by using Cronbach's alpha test. Moreover, to ensure a contribution to cohesion theory, three modes of generalisation (e.g., statistical, analytical, and case-to-case translation or transferability) were adopted for this study. Following the typology developed by Firestone (1990), this study, for example, statistically generalised data from inferring information in a sample of 480 texts to a wider population of second-language writers.

4.9 Manual Illustrations and Cohesion Measures

Based on statistical outcomes, Illustrations on cohesion features in selected texts aided this study to characterise the relationship between cohesion features automatically analysed by TAACO and the dependent variable (i.e., teachers' scores). Particularly, once statistical results suggested that specific independent variables correlated and predicted teachers' judgements of writing quality, manual illustrations were used to highlight the cohesion features present in students' compositions and more important to demonstrate how TAACO may have analysed those texts.

Such manual analyses may enable the exemplification of TAACO measures as shown in Figures 4.9 and 4.10. Figure 4.9, for example, provides examples of noun lemmas (highlighted in yellow) overlapping between adjacent sentences in

a selected essay while Figure 4.10 exemplifies synonym verbs (highlighted in green) and nouns (in yellow) overlapping between paragraphs in an email.

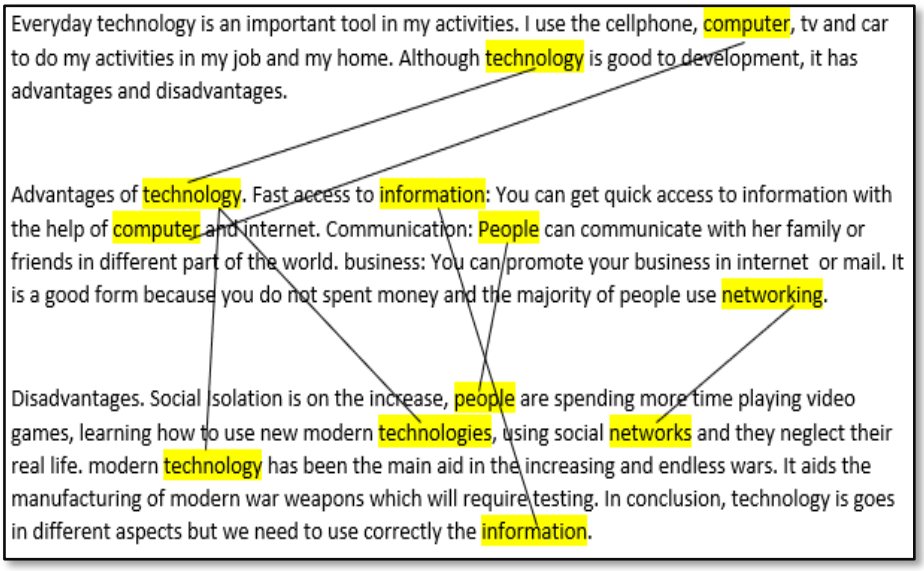


Figure 4.9 – Manual Analysis of Noun Overlap: Essay

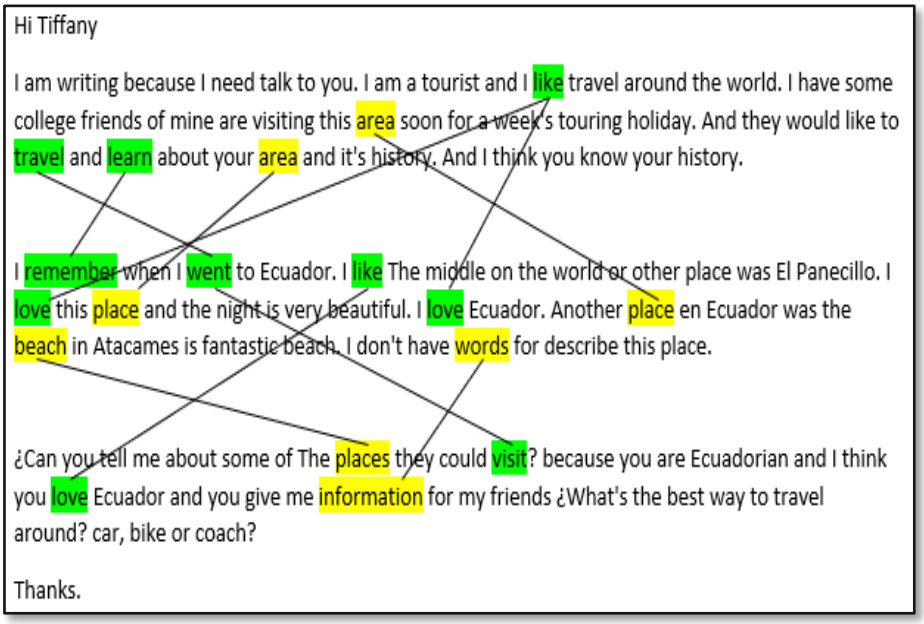


Figure 4.10 – Manual Analysis of Noun and Verb Synonyms: Email

While these manual analyses may evoke triangulation techniques (e.g., Egbert & Baker, 2019), these illustrations align more closely to a multi-methods approach adopted in this study to analyse cohesion in L2 writing.

Nevertheless, considering the ideas set out by Egbert and Baker (2019), this manual analysis strategy aims to (a) present cohesion outcomes in a more

detailed way; (b) lead to a better and more thorough understanding of the automatic analysis of cohesion features in L2 writing; (c) provide confirmation of cohesion findings; (d) facilitate verification of cohesion outcomes by searching for "(ir) regularities"; (e) "provide evidence for the validity of research findings"; (f) demonstrate "the reliability of the methods and findings"; and (g) provide "opportunities for more robust interpretations" (pp. 6-7).

Finally, the manual analysis could also be used to show discrepancies between what a manual analysis would code as examples of cohesion, and what the tool will have counted. It may be worth noting that this does not invalidate the quantitative findings. Instead, it indicates that there is a degree of 'noise' in the statistics.

4.10 Ethical Considerations

Various ethical and practical considerations were adopted to protect the dignity, rights, and welfare of students, teachers, and school authorities who granted permission to collect the texts used in this study. Such considerations involved receiving approval from the Ethics Committee (reference number: D1920-100), reaching students by first contacting schools and teachers, highlighting students' voluntary participation, assuring anonymity and confidentiality, and explaining the steps taken for data protection and storage.

To obtain students' consent, it first involved explaining the details of this research project to the school authorities and teachers. For example, by sending emails (i.e., invitation) to different potential schools and then visiting those that showed interest, I had the opportunity to explain in person the details of this research project to school authorities, teachers, and students. In that respect, a research information sheet that included the details of the study (e.g., aims and purposes of the project, contact details) and a consent form including relevant information was handed over to teachers and students. The research information sheet, which served as a guide for the verbal explanation of the project, enabled this study to assess students' understanding and fully inform them about the steps to be taken if they accepted to share their compositions.

Students were familiarised with the project's aims, benefits, and implications, as well as that their personal information, identities, or information that could affect them would be removed.

Likewise, ethical considerations for ensuring the confidentiality and anonymity of the data collected were implemented before, during, and after data collection. Such ethical considerations stated in the contributor's consent form emphasised that students voluntarily shared their compositions and scores to be stored in a database. Likewise that there was no compulsion for L2 writers to give their compositions for this research project. That is, if they chose to contribute, they could withdraw from the study at any time. That would not influence them, their courses or their grades received.

Furthermore, students were informed that any information given would be used solely for research purposes, which may include publications, academic conferences, or seminar presentations. Finally, students were assured that all information provided would be treated as confidential as well as that the researcher will make every effort to preserve their anonymity. (See Appendix II for the ethical approval certificate and the research information sheet for this project).

Descriptive Findings

5.0 Introduction

This section is set out to include descriptive statistics, exploratory, and confirmatory analyses on the index-based cohesion measurements in L2 writing. Using the SPSS 28 statistical software, this chapter begins by presenting statistical summaries of TAACO's outcomes. Then, checks on different assumptions are presented (e.g., reliability tests and principal component analyses). Those tests enabled this study to check the normality of data and aided in reducing the number of indexes measuring cohesion features in L2 writing.

5.1 Descriptive Statistics

In order to explore the types of cohesion features occurring in L2 writing, descriptive statistics elucidated the basic characteristics underlying the collected data. Data summaries included describing and realising the multiple variables measured at the continuous levels (i.e., TAACO indexes) and ordinal levels (i.e., teachers' scores).

Continuous independent variables were obtained from TAACO cohesion measures (e.g., means and ratios). In contrast, the dependent variable, an ordinal measurement variable, included discrete scales associated with teachers' scores on a scale of 1 to 10 points. However, texts receiving scores below 5 points were excluded from this study. Lower-scored texts that included too many errors (e.g., not enough words, extensive grammatical and lexical mistakes) were impractical to be analysed with automatic tools. Consequently, texts with higher teachers' scores that met basic requirements for the B2 level as suggested by the CEFR writing standards were kept for analysis (e.g., texts with at least 140 words divided into sentences and paragraphs).

In addition, previous studies suggest that an ordinal variable (e.g., teachers' scores) can be treated as an interval scale. Scholars have indicated that ordinal variables with five or more categories can often be used as continuous variables (e.g., Norman, 2010; Sullivan & Artino Jr, 2013). For example, past and recent studies on cohesion have treated teachers' scores as interval values to explore

the degree of association between teachers' judgements of writing quality and continuous variables (e.g., Crossley et al., 2019; Crossley & McNamara, 2012b).

Items	Min.	Max.	Sum	Mean	S.D.
Teachers' scores	5	10		7.8	1.6
Number of words per text	143	312	50194	212.3	40.3
Number of sentences per text	5	22	3006	12.5	3.5
Number of paragraphs per text	3	6	1035	4.3	0.78

Table 5.1 – Descriptive Statistics for the Collected Essays

Items	Min.	Max.	Sum	Mean	S.D.
Teachers' scores	6	10		8.1	1
Number of words per text	140	276	41936	174.7	29.8
Number of sentences per text	8	31	3622	15	3.3
Number of paragraphs per text	2	8	1201	5	1.2

Table 5.2 – Descriptive Statistics for the Collected Emails

The number of words, sentences, and paragraphs produced by L2 writers, and essential elements to analyse cohesion in essays and emails are summarised in Tables 5.1 and 5.2 above.

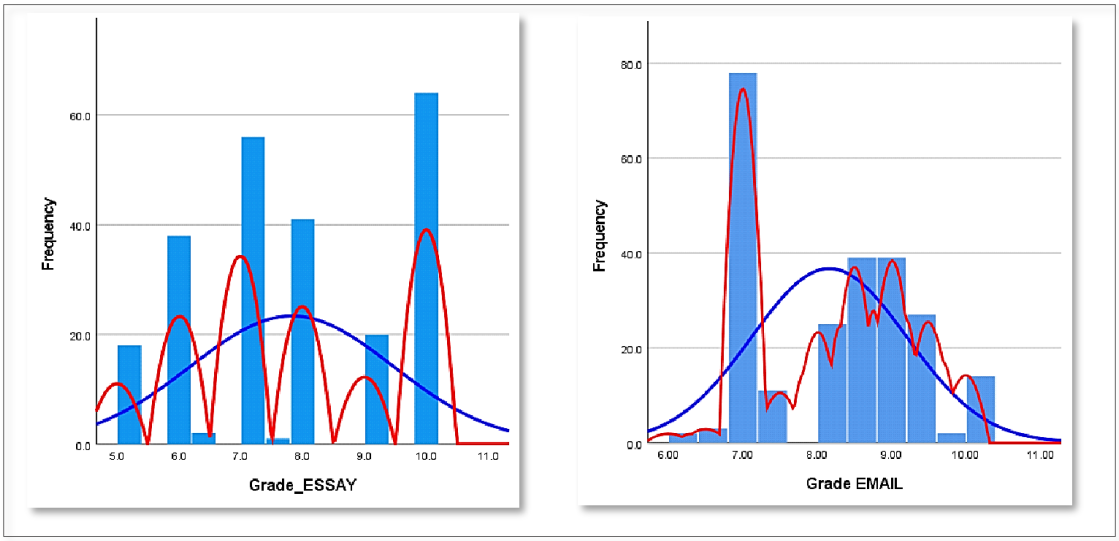


Figure 5.3 – Kernel Density Plots for the Dependent Variable

Moreover, descriptive summaries aided this study to comprehend better the limits of the data. For example, the numerical summaries and kernel density plots (Howell, 2012) presented in Figure 5.3 above showed that the collected data included mostly essays and emails with higher scores (e.g., 7.8 and 8.1 average scores, respectively).

Those data summaries suggest that the range of teachers' scores in both data sets is narrow (e.g., a 6-point scale for essays and a 5-point scale).

More relevant, those summaries indicate that the collected texts comprised noticeably short texts (e.g., averages of 212 words for essays and 175 for emails). However, although descriptive summaries propose that the data included texts with enough sentences and paragraphs for automatic and manual analyses of cohesion features, short texts may be a limitation for cohesion analysis in larger text segments.

5.2 Cronbach's Alpha Checks

Once the variables met basic statistical assumptions (e.g., data have a normal distribution), Cronbach's alpha statistical analyses were conducted. Cronbach's Alpha checks provided a coefficient ranging between 0 and 1 of inter-item correlations, enabling this study to verify how closely related the set of variable scores on cohesion were as a group. This internal consistency check on the data added an extra validity dimension to this study (e.g., L. Cohen et al., 2018; Tavakol & Dennick, 2011).

Previous studies on cohesion have used Cronbach's alpha to check the internal consistency of their instruments for determining cohesion features in writing (e.g., Crossley, Kyle, et al., 2014). For this study, reliability coefficient analyses were conducted on all (168) indexes provided by TAACO to measure cohesion features in essays and emails. Specifically, Cronbach's alpha results showed an $\alpha = 0.921$ for essays, and $\alpha = 0.907$ for emails.

Furthermore, Cronbach's alpha test enabled this study to sift through scores that may affect the internal consistency of the data. Hence, after checking whether higher Pearson correlations were measuring the same construct and whether Pearson correlation coefficients of less than 0.3 might not be measuring the same construct, a reduced number of variables were selected.

Once the variables were removed, Cronbach's alpha results indicated that the remaining independent variable scores in each dataset reached acceptable reliability or a high level of internal consistency coefficient (DeVellis, 2003; Tavakol & Dennick, 2011). The new Cronbach's alpha results comprised a smaller number of indexes: 74 indexes showed an α = 0.924 for essays, and 76 indexes indicated an α = 0.906 for emails. See Tables 5.4 and 5.5.

Indexes	Indexes Removed	Indexes Kept	Total Indexes
Type-token Ratio and Density	15	0	15
Lexical overlap (sentence)	29	25	54
Lexical overlap (paragraph)	12	42	54
Semantic overlap	11	5	16
Connectives	25	0	25
Givenness	2	2	4
Subtotal TAACO indexes	94	74	168

Table 5.4 – Indexes After Cronbach's Alpha Test: Essays

Indexes	Indexes Removed	Indexes Kept	Total Indexes
Type-token Ratio and Density	15	0	15
Lexical overlap (sentence)	33	20	54
Lexical overlap (paragraph)	8	46	54
Semantic overlap	8	8	16
Connectives	25	0	25
Givenness	2	2	4
Subtotal TAACO indexes	92	76	168

Table 5.5 – Indexes After Cronbach's Alpha Test: Emails

Cronbach's alpha findings indicated that ninety-four correlation coefficients for the essays and ninety-two for the emails were lower than 0.3. This yielded seventy-four indexes for essays and seventy-six for emails to be worthy of retention and further statistical analysis. Coincidentally, variables linked to measures on type-token, ratio and density as well as on connectives were removed after conducting Cronbach's alpha tests on both variables measuring essays and emails.

5.3 Multicollinearity Checks

Additionally, the assumption of collinearity was tested. Multicollinearity was a concern as the correlation plots (Wei et al., 2017) indicate that the remaining variables (e.g., 74 for essays and 76 emails) highly correlated among them. See the left plots in Figures 5.6 and 5.7.

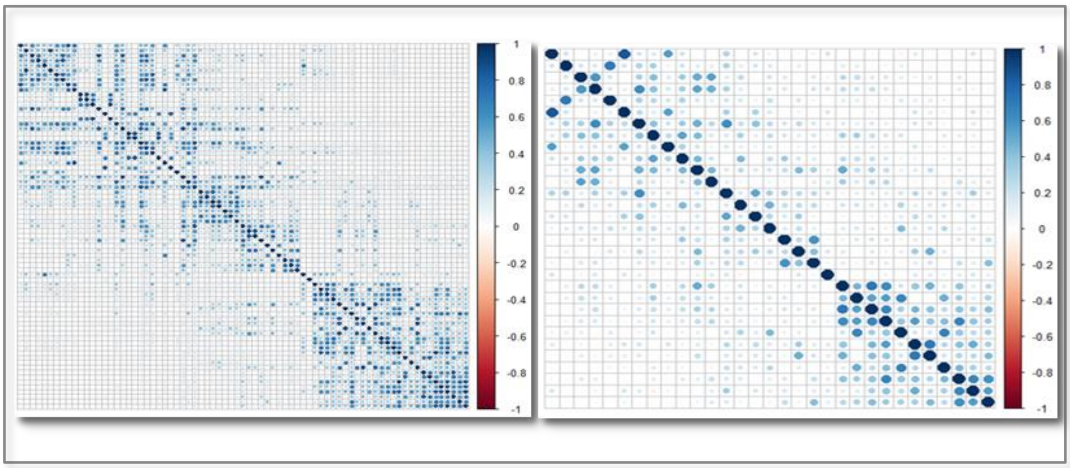


Figure 5.6 – Collinearity Checks on Variables in Essays

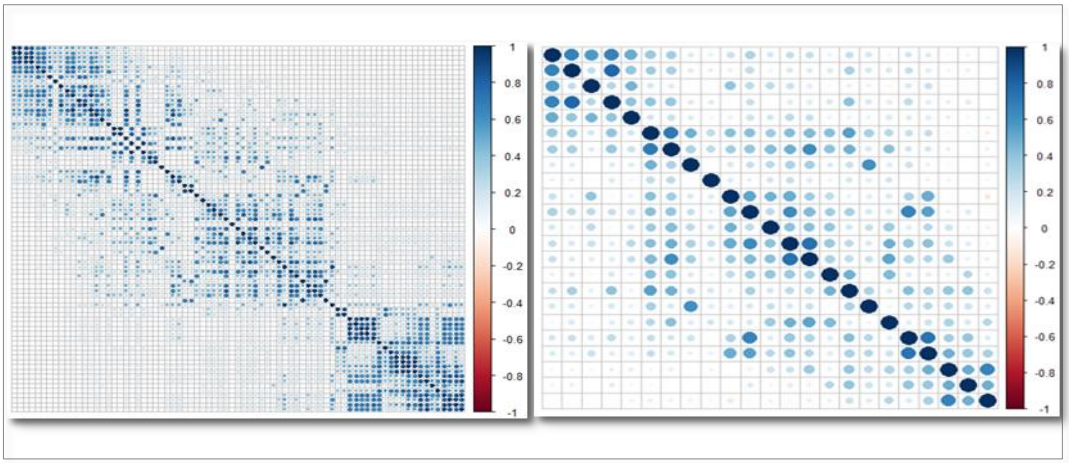


Figure 5.7 – Collinearity Checks on Variables in Emails

The tolerance and variance inflation factor (VIF), set to measure less than five equal to moderate correlation (Lewis-Beck & Lewis-Beck, 2016), enabled this study to remove highly related variables and check multicollinearity issues on variables measuring various cohesion features in both data sets.

After the VIF check, the remaining variables showed no multicollinearity issues. That is, variables that had correlations >.75 were removed (see the right plots in Figures 5.6 and 5.7 above).

These new sets included thirty variables for essays and twenty-two variables for emails from the original 168 indexes on each dataset as shown in Tables 5.8 and 5.9.

Groups of indexes	Indexes Removed	Indexes Kept
Lexical overlap (Sentence)	15	10
Lexical overlap (Paragraph)	26	16
Semantic overlap	2	3
Givenness	1	1
Total indexes removed/kept	44	30

Table 5.8 – Indexes After Checking Assumptions: Essays

Groups of indexes	Indexes Removed	Indexes Kept
Lexical overlap (Sentence)	17	3
Lexical overlap (Paragraph)	32	14
Semantic overlap	3	5
Givenness	2	0
Total indexes removed/kept	54	22

Table 5.9 – Indexes After Checking Assumptions: Emails

5.4 Principal Component Analysis

After checking variable reliability and collinearity, a principal component analysis (PCA) aided in further verifying the dimensionality of TAACO cohesion variables. For example, during the PCA analyses on variables in both datasets, the correlation matrix and the anti-image correlation matrix confirmed that 30 variables for essays and 22 variables for the email dataset had a higher Kaiser-Meyer-Olkin (KMO) measure (i.e., KMO > .5) (Kaiser, 1974).

In particular, the sampling adequacy tests suggested that all (KMO) outcomes were greater than 0.737 for essays and 0.761 for the email dataset. Those results, regarded as 'middling' to 'meritorious' according to Kaiser (1974), indicated the adequacy of sampling for a principal component analysis on both datasets.

Similarly, small values (e.g., $p < .001$) on Bartlett's Test of Sphericity indicated that a PCA might be helpful in the analysis of variables measuring cohesion in text segments in essays and emails.

5.4.1 PCA Findings in Essays

The PCA findings on variables measuring cohesion in essays revealed that nine components had eigenvalues greater than one. That is, eigenvalues can help us to determine the relevant components in the data.

Those results were confirmed by a visual inspection of the scree plot and the total variance table, indicating that nine components should be retained (Cattell, 1966). Eigenvalues greater than one accounted for 22.9%, 11.5%, 9.2%, 6.7%, 6.4%, 5.3%, 5.0%, 4.2%, and 3.4% of the total variance. (See Table 5.10 for more details).

Components / Items	Eigen Values	Variance Percentage	Cumulative Variance
C1: Semantical similarity, lexical overlap, and givenness	6.8	22.9	22.9
C2: Lexical and semantical overlap	3.4	11.5	34.4
C3: Lexical overlap	2.7	9.2	43.6
C4: Lexical overlap	2.0	6.7	50.4
C5: Lexical overlap	1.9	6.4	56.9
C6: Lexical overlap	1.6	5.3	62.3
C7: Lexical overlap	1.5	5.0	67.3
C8: Lexical overlap	1.2	4.2	71.5
C9: Lexical overlap	1.0	3.4	75.0

Table 5.10 – Eigenvalues from the PCA in Essays

In addition, the scree plot corresponding to these factors is shown in Figure 5.11.

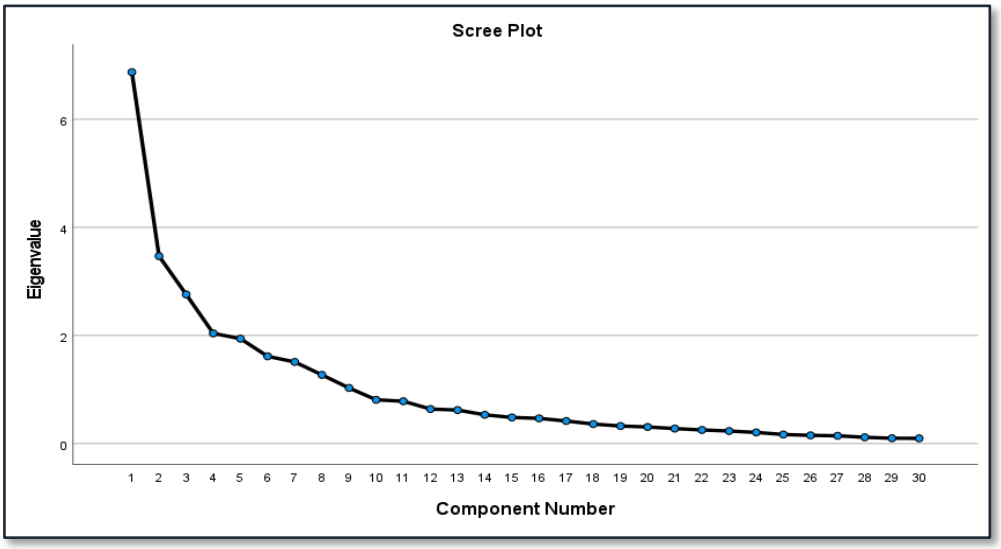


Figure 5.11 – PCA Eigenvalues of Selected Components in Essays

The nine-component solution met the interpretability criteria, explaining 75% of the total variance in variables measuring cohesion in the essay dataset. In addition, a varimax orthogonal rotation aided data interpretation (Thurstone, 1947). The varimax rotation was consistent with the cohesion measures in various text segments. Specifically, TAACO scores designed to measure cohesion features in text segments were related to strong loadings in components 1 – 9. Such items included semantical similarity, lexical overlap, and givenness items occurring at the paragraph, sentence, and whole-text levels.

More importantly, the final pattern for the nine-factor solution may help further investigate the types of cohesion relations in different text segments of essays by L2 writers. In particular, the PCA findings suggest that thirty of the original seventy-two indices were grouped into nine components. Lexical and semantical overlap and givenness items were present in text segments of essays. Such items included:

- Noun synonyms, LSA cosine similarity, noun, and pronoun lemmas overlapping between paragraphs.
- Givenness features (e.g., repeated content and pronoun lemmas) occur in the entire text.
- Content words, verbs, verb synonyms, and argument items overlap at the sentence level.

- Pronoun and argument items overlap at the sentence level, and pronouns overlap between paragraphs.
- Function words and all lemmas overlap at the sentence level.
- Adjectives, function words, pronouns, argument features, verbs, content words, and adverbs overlap at the paragraph level.

Components / Items	Rotated Component Coefficients								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
synonym overlap (paragraph, noun)	0.8								
LSA cosine similarity (adjacent paragraphs)	0.7								
binary adjacent paragraph overlap nouns	0.7								
adjacent paragraph overlap nouns and pronouns	0.6								
repeated content lemmas and pronouns	0.4								
adjacent two-sentence overlap content words (*)		0.8							
binary adjacent two-sentence overlap verbs		0.7							
synonym overlap (sentence, verb)		0.6							
adjacent sentence overlap nouns and pronouns (*)		0.5							
binary adjacent two-sentence overlap noun pronouns		0.5							
adjacent two-sentence overlap pronouns			0.8						
binary adjacent sentence overlap pronouns			0.7						
adjacent two-sentence overlap noun and pronouns			0.6						
adjacent paragraph overlap pronouns			0.5						
binary adjacent sentence overlap function words				0.8					
adjacent sentence overlap all lemmas				0.7					
adjacent two-sentence overlap function words				0.6					
adjacent two-paragraph overlap adjectives (**)					0.9				
binary adjacent two-paragraph overlap adjectives					0.9				
adjacent paragraph overlap adjectives					0.8				
adjacent two-paragraph overlap function words (**)						0.8			
binary adjacent two-paragraph overlap pronouns						0.8			
adjacent two-paragraph overlap noun / pronouns (**)						0.6			
adjacent paragraph overlap function words							0.9		
adjacent two-paragraph overlap function words							0.8		
adjacent two-paragraph overlap verbs								0.8	
binary adjacent paragraph overlap verbs								0.7	
adjacent two-paragraph overlap content words								0.5	
binary adjacent two-paragraph overlap adverbs									0.9
adjacent paragraph overlap adverbs (**)									0.9

(*) Sentence normed
(**) Paragraph normed

Table 5.12 – Communalities and Component Loadings for Essays

Table 5.12 above shows the component loadings and communalities of the rotated solutions conducted on variables measuring cohesion features in essays.

5.4.2 PCA Analysis in Emails

Like in the PCA analysis of essays, the PCA findings on the variables measuring cohesion features in emails by L2 writers revealed that seven components had eigenvalues greater than one. Similarly, a visual inspection of the scree plot and the total variance table indicated that all seven components should be retained. In particular, the eigenvalues for the seven factors accounted for about 29.3%, 11.9.0%, 10.2%, 7.8%, 6.8%, 5.8%, and 4.5% of the total variance. (See Table 5.13 for more details). The scree plot corresponding to these factors is shown in Figure 5.14.

Components / Items	Eigen Values	Variance Percentage	Cumulative Variance
C1: Lexical and semantical overlap	6.4	29.3	29.3
C2: Lexical overlap	2.6	11.9	41.3
C3: Lexical overlap	2.2	10.2	51.6
C4: Lexical overlap	1.7	7.8	59.4
C5: Lexical and semantical overlap	1.5	6.8	66.3
C6: Lexical overlap	1.2	5.8	72.2
C7: Semantical overlap	1	4.5	76.8

Table 5.13 – Eigenvalues from the PCA in Emails

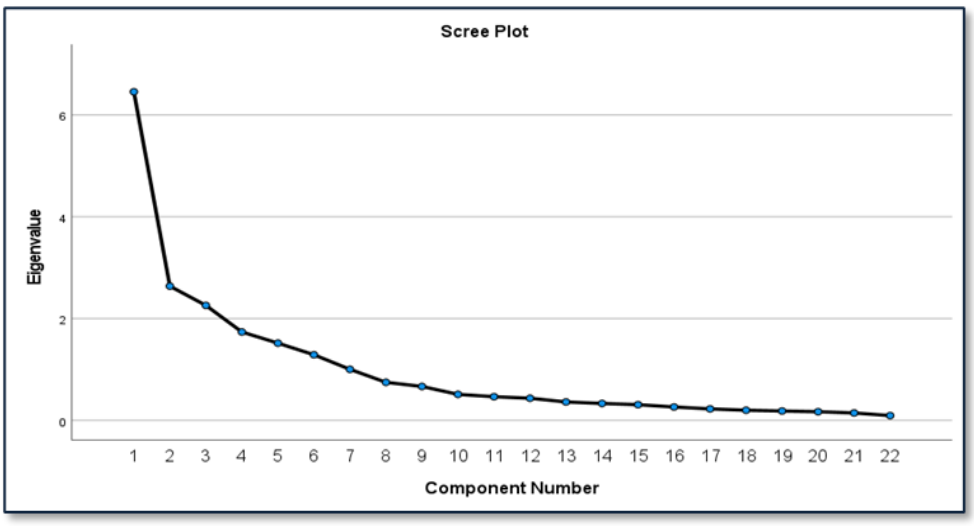


Figure 5.14 – PCA Eigenvalues of Selected Components in Emails

The seven-component solution met the interpretability criterion explaining 76.8% of the total variance. The varimax rotation was consistent with cohesion measures across different email segments. TAACO scores designed to measure

cohesion features were related to strong loadings in Components 1 – 7. The final pattern for the seven-factor solution, including twenty-two of the original seventy-six indexes, is presented in Table 5.15.

Components / Items	Rotated Component Coefficients						
	C1	C2	C3	C4	C5	C6	C7
binary adjacent two-sentence overlap noun lemmas	0.8						
synonym overlap (sentence, noun)	0.8						
binary adjacent sentence overlap content lemmas	0.8						
adjacent two-sentence overlap function lemmas (*)	0.6						
binary adjacent paragraph overlap content lemmas		0.8					
binary adjacent paragraph overlap pronoun lemmas		0.7					
binary adjacent paragraph overlap verb lemmas		0.7					
binary adjacent paragraph overlap noun lemmas		0.5					
adjacent two-paragraph overlap verb lemmas			0.9				
adjacent paragraph overlap verb lemmas			0.8				
adjacent two-paragraph overlap verb lemmas (**)			0.8				
binary adjacent two-paragraph overlap function lemmas				0.8			
binary adjacent two-paragraph overlap content lemmas				0.8			
adjacent two-paragraph overlap pronoun lemmas				0.7			
adjacent paragraph overlap noun and pronoun lemmas					0.8		
adjacent two-paragraph overlap noun lemmas					0.7		
synonym overlap (paragraph, noun)					0.6		
binary adjacent two-paragraph overlap adjective lemmas						0.9	
adjacent paragraph overlap adjective lemmas (**)						0.8	
synonym overlap (sentence, verb)							0.7
lsa cosine similarity (adjacent paragraphs)							0.6
synonym overlap (paragraph, verb)							0.6

(*) Sentence normed.
(**) Paragraph normed.

Table 5.15 – Communalities and Component Loadings: Emails

The main component loadings and communalities of the rotated solutions obtained from the PCA analysis (summarised in Table 5.15 above) indicate that lexical overlap and semantical overlap items were found to occur in different text segments of emails. Such items included (a) noun, noun synonyms, content, and function words overlapping at the sentence level; (b) content words, pronouns, verbs, and nouns overlapping at the paragraph level; (c) verbs overlapping between adjacent paragraphs and in a two-paragraph span; (d) function, content, and pronoun overlap in a two-paragraph span; (e) argument and nouns overlap in adjacent paragraphs and a two-paragraph span; (f) adjective overlap between

adjacent paragraphs and in a two-paragraph span; and (g) verb synonyms overlapping in sentences and LSA cosine similarity in adjacent paragraphs.

5.5 Summary of Descriptive Findings

A series of tests enabled the removal of invalid data points from two datasets (e.g., essays and emails). By conducting a series of statistical checks (e.g., Alpha Cronbach's values > .60, eigenvalues > 1, anti-image correlations > .5, VIF < 5), these procedures enabled this study to keep and eliminate variables provided by the TAACO tool. Such findings included variables that measure cohesion features (e.g., lexical overlap, semantical similarity, and givenness items) occurring between adjacent sentences and paragraphs, in a two-sentence paragraph, and the entire text. More importantly, these results were used to further the analysis of cohesion analysis in L2 writing to answer the research questions posed for this study.

Findings on Cohesion Features in Text Segments

6.0 Introduction

This chapter reports the correlational and regression findings on the relationship between textual cohesion properties occurring in text segments and teachers' judgements of writing quality. The chapter begins by reporting the statistical tests to determine which cohesion items occurring in text segments (e.g., sentence, paragraph, the entire text) correlated with the teachers' scores in essays and emails by L2 writers. It also presents stepwise regression findings to determine which independent variables best predicted the dependent variable in the collected texts. Further, this chapter exemplifies the salient correlational and regression outcomes by manually describing cohesion features in selected essays and emails.

6.1 Correlational Findings in Essays

To answer the first and second research questions regarding the relationship between cohesion features in text segments and the teachers' judgements of writing quality, a series of Pearson correlations were conducted with the dependent and independent variables summarised in the previous chapter.

Overall, the findings suggest that weak and significant positive correlations occurred between the teachers' judgements of writing quality (i.e., teachers' scores) and lexical, semantical, and givenness features appearing in paragraphs, sentences, and the entire text of collected essays.

The findings propose that there was a weak positive relationship between teachers' scores and the overlapping of specific lemma types (e.g., adjectives, function, pronouns, nouns, verbs, and argument items) at the paragraph level, that is, between adjacent paragraphs and in a two-paragraph span.

Additionally, the findings indicate that teachers' scores positively correlated (although very weak) with the overlapping of lemma types (e.g., pronouns, function words, and all lemma types) at the sentence level (i.e., between adjacent sentences and in a two-sentence span).

Furthermore, semantical similarity variables that measure noun and verb synonyms occurring exclusively at the paragraph level of essays correlated with

teachers' scores. These weak correlational results indicated that higher values on cohesion measures might be associated with higher scores in essays.

However, another possible explanation for these correlations may be related to the frequencies comprising the dependent variable. That is, the collected texts included scores ranging from 5 to 10 points rather than 1-to-10-point scales. Texts including grades less than 5 points were removed. As mentioned earlier, those texts were discarded because they had too many errors (e.g., extensive spelling and punctuation issues, too many Spanish words, and not enough English words, sentences, and paragraphs) to be adequately analysed with the automatic tools. That possible limitation in narrowing the scoring scale cannot be ruled out. In other words, limiting the scale to a 5-point scale may have influenced the outcomes and, therefore, may have decreased the chances of getting stronger correlations between linguistic features and teachers' scores.

The main results of those very weak correlations occurring in the essay dataset are summarised in Table 6.1. (See Appendix III for a complete list of correlational outcomes).

Indexes	***r***
adjacent two-paragraph overlap adjective lemmas (paragraph normed)	.198**
adjacent two-paragraph overlap function lemmas (paragraph normed)	.184**
binary adjacent two-paragraph overlap adjective lemmas	.178**
synonym overlap (paragraph, verb)	.178**
adjacent paragraph overlap pronoun lemmas	.177**
binary adjacent sentence overlap function lemmas	.167**
synonym overlap (paragraph, noun)	.165*
binary adjacent sentence overlap pronoun lemmas	.152*
binary adjacent paragraph overlap noun lemmas	.140*
adjacent sentence overlap all lemmas	.135*
adjacent two-sentence overlap pronoun lemmas	.134*
adjacent two-paragraph overlap noun and pronouns (paragraph normed)	.130*
*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).	

Table 6.1 – Correlation Between PCA Items and Grades of Essays

However, these results should be interpreted with caution not only because they are based on extremely weak correlations (e.g., <0 +/–3) (e.g., L. Cohen et al.,

2018) but also because correlations do not equal causation, clarify very little the causes of the relationship, may fail at identifying causal relationships with other variables, and cannot provide conclusive information as scholars warn on the interpretation of correlational outcomes (e.g., Stangor, 2011; Stanovich, 2013)

Despite the limitations, the correlational findings helped to uncover a relationship (although weak) between teachers' scores and cohesion features in text segments.

In particular, the findings suggest an association between teachers' scores and lexical overlap items (e.g., adjectives, function words, pronouns, and nouns) at the paragraph level. Those correlations associated with higher grades included:

- the adjacent paragraph overlap of *adjective* lemmas in a two-paragraph span (paragraph normed) (r(240) = .198, p = .002),
- the adjacent paragraph overlap of *function words* in a two-paragraph span (paragraph normed) (r(240) = .184, p = .004),
- the adjacent paragraph overlap binary of *adjective* lemmas in a two-paragraph span (r(240) = .178, p = .006),
- the adjacent paragraph overlap of *pronouns* (paragraph normed) (r(240) = .177, p = .006),
- the adjacent paragraph overlap binary of *nouns* (r(240) = .140, p = .030),
- the adjacent paragraph overlap of *argument* lemmas in a two-paragraph span (paragraph normed) (r(240) = .130, p = .045).

In addition, a weak relationship between scores and semantical similarity items (e.g., noun and verb synonyms) was found at the paragraph level. Those correlations, associated with higher grades, included:

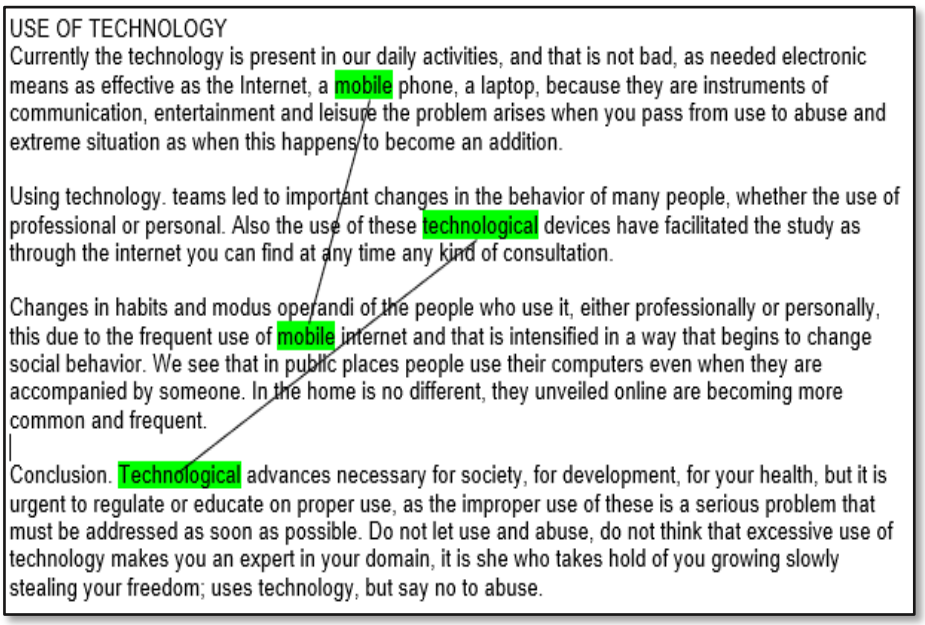
- *verb synonyms* overlapping between paragraphs (r(240) = .178, p = .006),
- *noun synonyms* overlapping between paragraphs r(240) = .165, p = .011).

The correlational outcomes also signalled a weak relationship between scores and lexical overlap (e.g., function words, pronouns, and all lemmas) at the sentence level. Those weak correlations were associated with higher scores in essays and included:

- the adjacent overlap binary of *function words* occurring between sentences (r(240) = .167, p = .010),
- the adjacent overlap binary of *pronouns* overlapping between sentences (r(240) = .152, p = .018),
- the adjacent overlap of *all lemmas* occurring between sentences (r(240) = .135, p = .037), and
- the adjacent overlap of *pronouns* overlapping in a two-sentence span (r(240) = .134, p = .038).

6.1.1 Illustrating the Correlational Outcomes in Essay Samples

Once correlational findings aided in answering the first research question, which sought to determine cohesion features occurring in text segments, manual analyses were conducted to help understand better those measures of cohesion in L2 writing. For example, in the analysis of lexical overlap items (e.g., adjectives, function words, argument features) occurring in a two-paragraph span, the manual probe indicates that adjective overlap may contribute to cohesion in essays. See the sample essay in Figure 6.2.



USE OF TECHNOLOGY

Currently the technology is present in our daily activities, and that is not bad, as needed electronic means as effective as the Internet, a mobile phone, a laptop, because they are instruments of communication, entertainment and leisure the problem arises when you pass from use to abuse and extreme situation as when this happens to become an addition.

Using technology. teams led to important changes in the behavior of many people, whether the use of professional or personal. Also the use of these technological devices have facilitated the study as through the internet you can find at any time any kind of consultation.

Changes in habits and modus operandi of the people who use it, either professionally or personally, this due to the frequent use of mobile internet and that is intensified in a way that begins to change social behavior. We see that in public places people use their computers even when they are accompanied by someone. In the home is no different, they unveiled online are becoming more common and frequent.

Conclusion. Technological advances necessary for society, for development, for your health, but it is urgent to regulate or educate on proper use, as the improper use of these is a serious problem that must be addressed as soon as possible. Do not let use and abuse, do not think that excessive use of technology makes you an expert in your domain, it is she who takes hold of you growing slowly stealing your freedom; uses technology, but say no to abuse.

Figure 6.2 – Adjective Overlap in a Two-Paragraph Span

Interestingly, that finding broadly supports the work of other studies on cohesion in writing that link teachers' scores with textual features overlapping at the paragraph level. Crossley et al. (2016a, 2016b), for example, found that the

repetition of *adjective lemmas*, occurring between adjacent paragraphs and in a two-paragraph span, correlated with raters' scores of essays by L1 and L2 college-level writers.

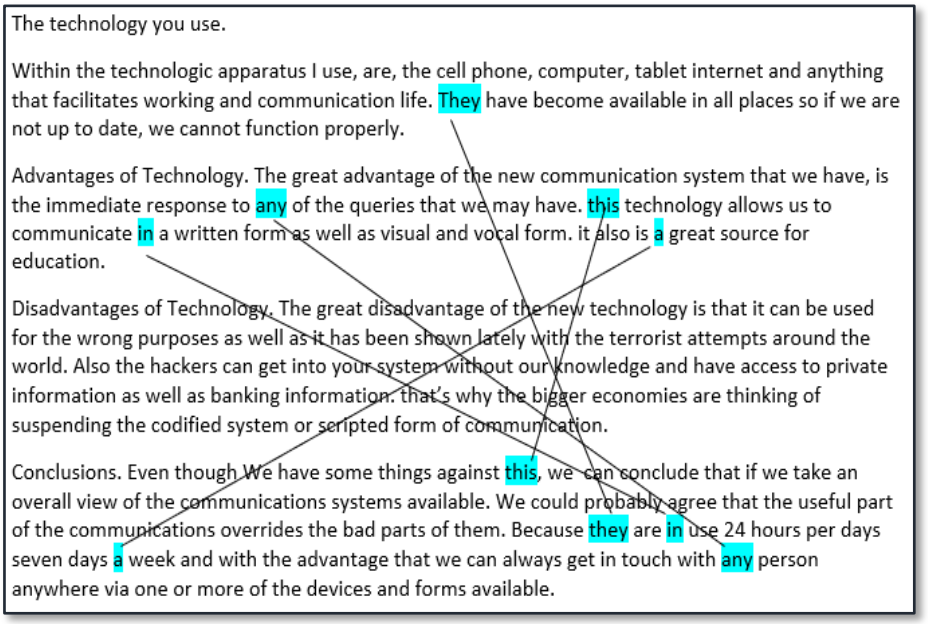


Figure 6.3 – Function Word Overlap in a Two-Paragraph Span

The overlapping of function words (e.g., pronouns, prepositions, and determiners) overlapping in a two-paragraph span is another manually analysed outcome that may help to comprehend better the automatic analysis by TAACO.

However, such function words overlapping in a two-paragraph span presented in Figure 6.3 above suggest that it is unlikely that 'in', 'this', or 'any' are coherence markers as indicated in the text (i.e., a repetition that forms a tie/anaphor).

This result appears to be consistent with data obtained by Crossley et al. (2016a), who found that function words overlap in adjacent paragraphs and a two-paragraph span in essays by L2s. But, the manual analysis proposes that these function words are unrelated high-frequency words that occur several times in the same text, but they are not cohesive in any meaningful sense.

A possible explanation for this might be that the influence of function words as cohesion features in a text may be linked to lexical diversity measures to help determine the number of different words in texts. For example, if a writer uses many different words with little word repetition; hence, high lexical diversity texts are likely to correlate with low-frequency words.

Those calculations that involve the presence of more frequently used items may suggest a higher cohesion in a text, while less cohesive compositions may include high lexical diversity items. Those results must be taken with caution, as lexical diversity may not be equated with cohesion.

Another outcome manually analysed included argument features overlapping in a two-paragraph span. The argument overlap notion has been described by scholars (e.g., Graesser et al., 2004; Van Dijk, 1978). For example, Graesser et al. (2004) argue that argument overlap "occurs when a noun, pronoun, or NP in one sentence is a co-referent of a noun, pronoun, or NP in another sentence" (199). Stemming from that definition, TAACO's developers used that notion to automatically analyse nouns and pronouns overlapping between adjacent paragraphs, as well as in a two-paragraph span.

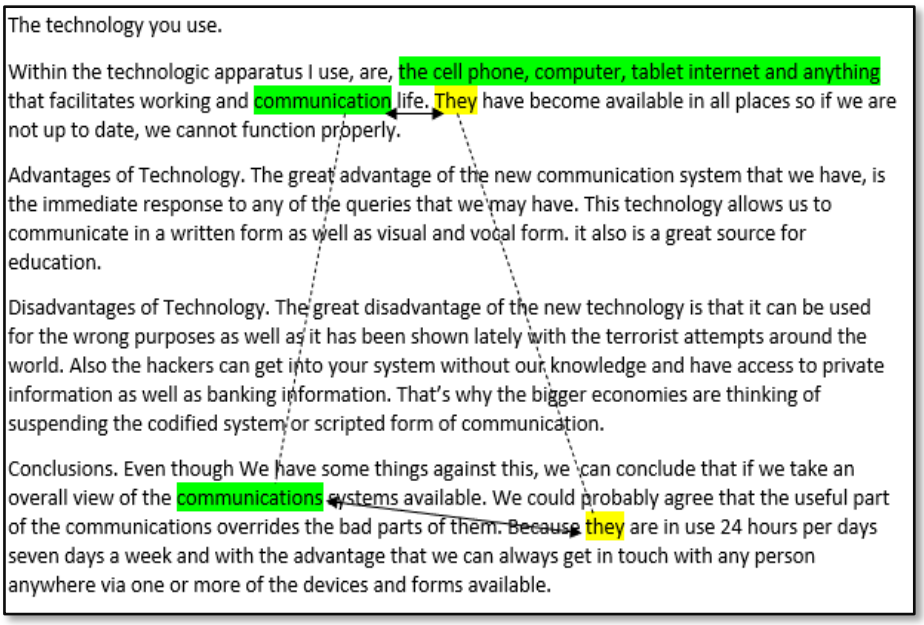


Figure 6.4 – Argument Overlap in a Two-paragraph Span

Specifically, noun and pronoun lemma types that occur at least once in the next two paragraphs of a collected essay are presented in Figure 6.4 above.

This result may be consistent with those of Crossley et al. (2016b), who found that the overlap between *argument features* in a two-paragraph span correlated with the scores of essays by L1 college writers. However, whilst the findings in this study broadly support the work of Crossley et al. (2016b) regarding argument features occurring in paragraphs in writing, Green (2012) showed that argument

features may not be extrapolated to writing quality. Specifically, Green's study found a non-significant difference in the incidence of nouns and pronouns between low and high L2 writing proficiency groups. Both L2 data groups used more argument overlap between sentences than L1 writers (i.e., more noun phrase repetition and extended anaphoric reference chains). Those differences hardly differ between less and more proficient L2 groups, however.

More relevant, Green's study suggests salient differences in cohesion features between the L1 and L2 groups, with L2 writing containing approximately five times more argument overlap than L1 writing. Similarly, Plakans and Gebril (2017) found that argument overlap between sentences had no major impact on writing performance across score levels (low and high) in the TOEFL writing section by L2 test-takers.

Another set of manual analyses was conducted on cohesion features occurring between paragraphs to further the comprehension of automatic analysis. In particular, illustrations of *pronouns* overlapping in adjacent paragraphs enabled this study to verify their association (although weak) with teachers' scores.

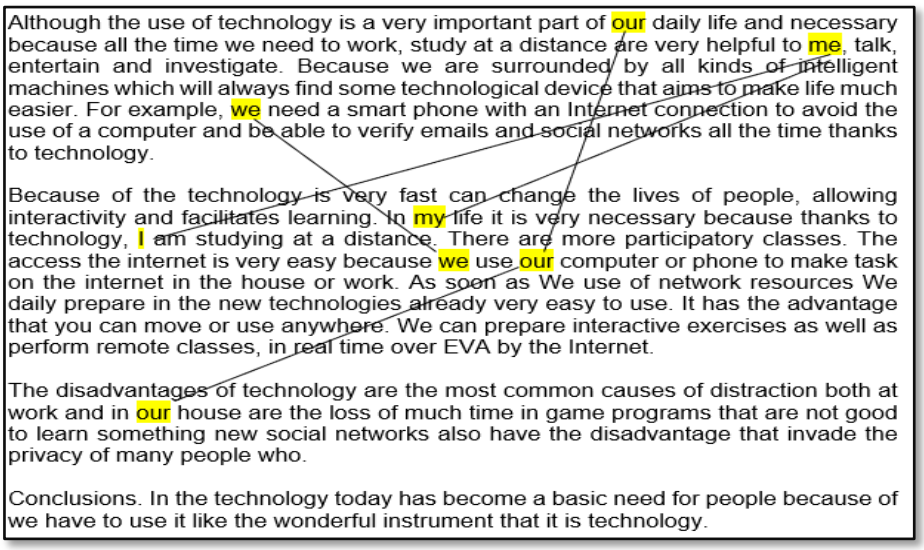


Figure 6.5 – Pronouns Overlap in Adjacent Paragraphs

It is encouraging to compare these findings on pronouns with those reported by Crossley et al. (2016a, 2016b), who found that pronouns overlapped in a two-paragraph span in essays by L1 and L2 writers. What is curious about these related results is that they corroborate that pronouns overlap in adjacent paragraphs of essays by L2 writers in Ecuador. See Figure 6.5 above.

In a similar study, Tian et al., (2021) found that the presence of *pronouns* as cohesive features predicted measures of writing fluency. Particularly, Tian et al. (2021) found that L2 writers who used more pronouns tended to show a higher degree of variance in text production. Perhaps, the presence of more pronouns hindered fluency because L2 writers needed to cope with the intricacies of using referential functions (e.g., anaphoric, cataphoric) underlying pronouns.

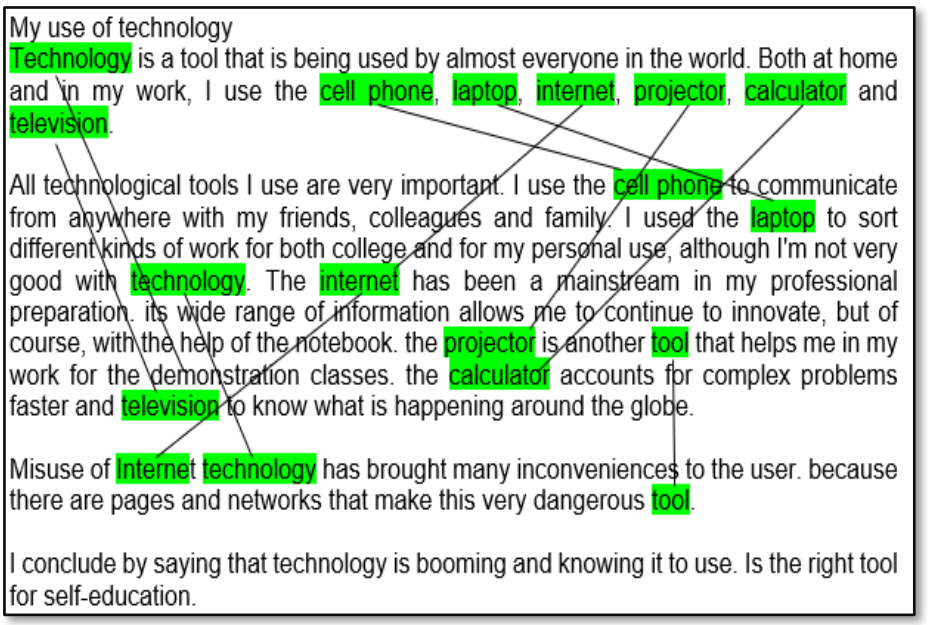


Figure 6.6 – Noun Overlap in Adjacent Paragraphs

Noun lemmas overlapping between adjacent paragraphs were also found to correlate with teachers' scores in essays by L2 writers (see nouns highlighted in green in Figure 6.6 above).

This outcome is in agreement with that of Crossley et al. (2016a), who found that nouns overlapping between adjacent paragraphs had a significant positive correlation with organisation scores in essays composed by L2 writers. Similarly, the outcomes in this study may support the finding on *nouns* by Guo et al. (2013). They found that nouns had a significant positive correlation with holistic essay scores for integrated essays by L2 writers (i.e., using reading and/or listening materials as stimuli for writing). However, their study did not specify the overlapping of nouns in any particular text segment.

Moreover, outcomes on verb and noun synonyms overlapping between paragraphs were illustrated to clarify better their association with teachers' scores

of essays. In that respect, the lexical database WordNet 2.1 (Fellbaum, 1998b) aided to verify the semantic relations occurring between paragraphs in a collected text. These two outcomes exemplified and highlighted in green (noun synonyms) and yellow (verb synonyms) in Figure 6.7 may be consistent with that of Crossley et al. (2016a), who found a significant positive correlation between verb synonyms overlapping between paragraphs with organisation scores of (r=.27) and combined scores of (r=.33).

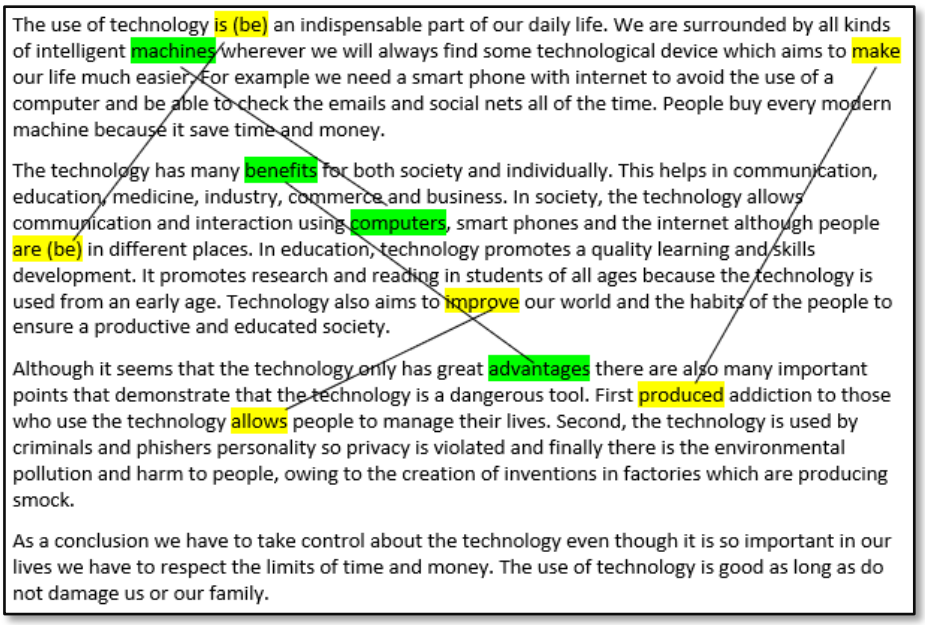


Figure 6.7 – Noun and Verb Synonyms Between Paragraphs

In accordance with the findings in this study, Crossley et al. (2016a) reported weak correlations between noun synonyms with organisation scores (r=.19) and the combined ratings of essays by L2 college-level writers (r=.22) as well as a significant linear increasing trend between the initial, middle, and final essays over a semester (η^2=.15).

The findings in this study are somewhat surprising given the fact that verb and noun synonym overlap also occurred at the sentence level. Crossley et al. (2016a), for example, found a significant positive correlation between noun synonyms and organisation score (r=.14) and with a combined score of (r=.14) as well as a significant positive correlation between verb synonyms with organisation score (r=.14) and combined score (r=.19). However, their study found no longitudinal development in the use of verb and noun synonyms at the sentence level in a semester of an intensive English language training program.

More relevant, the relationship between the noun and verb synonyms in paragraphs with higher essay grades found in this study and previous research may support the hypothesis that electronic vocabulary databases (e.g., WordNet; Fellbaum, 1998b) can help better understand "the human mental lexicon" (Landauer et al., 2007, p. 90).

However, despite these findings on noun and verb synonyms indicating L2's ability to use words carrying similar meanings to link similar ideas in text segments (i.e., paragraphs and sentences), it is unclear the influence of adjective synonyms (e.g., hot: burning, fiery, boiling), adverb synonyms (e.g., thoughtfully – pensively), or antonyms (e.g., cheerful – wistful) in L2 writing. TAACO does not include the analysis of these semantical overlap items.

Interestingly, as mentioned by Crossley et al. (2016b), previous studies suggest that semantical overlap showed positive relations with cohesion measures (e.g., McNamara, Crossley, et al., 2010; McNamara, Louwerse, et al., 2010). However, the presence of synonyms has shown no significant relationship with measures of text coherence (e.g., Crossley & McNamara, 2011b).

Along with cohesion features overlapping at the paragraph level, the results in this study also suggest that cohesion features occurring at the sentence level had a weak correlation with teachers' scores of essays by L2 writers in Ecuador. Lexical features at the sentence level seem to positively influence teachers' judgements of quality in essays. Such lexical features that correlated with teachers' scores included the overlap between adjacent sentences of function words, personal pronouns, all lemmas, and the overlap of personal pronouns in a two-sentence span in the collected essays. See Figures 6.8 – 6.11.

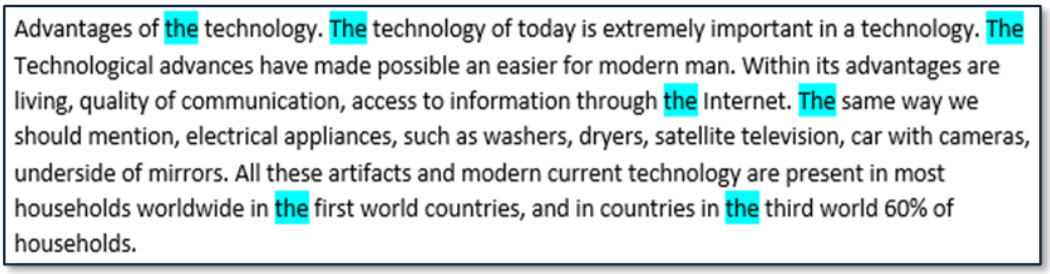

Advantages of the technology. The technology of today is extremely important in a technology. The Technological advances have made possible an easier for modern man. Within its advantages are living, quality of communication, access to information through the Internet. The same way we should mention, electrical appliances, such as washers, dryers, satellite television, car with cameras, underside of mirrors. All these artifacts and modern current technology are present in most households worldwide in the first world countries, and in countries in the third world 60% of households.

Figure 6.8 – Function Words Overlap in Adjacent Sentences

The use of technology is an indispensable part of our daily life. We are surrounded by all kinds of intelligent machines wherever we will always find some technological device which aims to make our life much easier. For example we need a smart phone with internet to avoid the use of a computer and be able to check the emails and social nets all of the time. People buy every modern machine because it save time and money.

Figure 6.9 – All Lemmas Overlap in Adjacent Sentences

I'm using computer and internet as a working tool that allows me to be more efficient, and help me to do better work. In addition I use the phone that allows me to communicate with my friends and family at any time.

Figure 6.10 – Personal Pronouns Overlap in Adjacent Sentences

Disadvantages of technology. From my perspective, the biggest disadvantage of the technology is, the loss of personal communication. Because if it is true, current technology brings people who are far too disjointed to people nearby. In this regard I should mention that it has become customary, that most people write text messages, personal photos taken during the meal. Personal photos are one of the most criticized. Because instead of dialogue with those who are present, young people prefer to maintain the dialogue and communication with those who are not present.

Finally we can conclude that the technology provides great benefits to humanity. Its main role is to create best useful tools, simplify saving time and effort of labour. the technology is very important in our society. because thanks to this we can communicate instantly anywhere in the world.

Figure 6.11 – Personal Pronoun Overlap in a Two-sentence Span

Particularly, weak correlations on cohesion features overlapping between adjacent sentences were found on function words (e.g., r= .16), pronouns (r= .16), all lemmas (r= .13), and pronouns (e.g., r= .13) overlapping in a two-sentence span. See sample essays 6.8 to 6.11 above that illustrate the overlapping of such lexical features at the sentence level in selected sample essays.

These results are in line with those of previous studies. For example, the correlational finding on *function words* overlapping with the adjacent sentence reported in this study may add evidence to the findings obtained by Crossley et al. (2016a), who found that function words overlapping in a two-sentence span had a significant positive correlation with organisation score (r=.37) and combined score (r=.42) in essays by L2 writers.

The correlation between function words in adjacent sentences and teachers' scores (See Sample essay 6.8 exemplifying the article 'the' as a function word)

is interesting because words such as the article 'the' also seem to signal cohesion relations. In that respect, while Halliday (1985, p. 292) explains that the definite article 'the', operating in the deictic function, does not specify information, Halliday suggests that information may be available elsewhere. That is, the information may be included in the preceding text (anaphorically), cataphorically, or homophorically (i.e., self-specifying) to refer to something unique (e.g., the Matrix).

Moreover, positive but weak correlational findings on *all lemmas* overlapping between adjacent sentences in this study (See sample essay 6.9 above) may be in accord with those of previous studies in L2 writing. For example, M. Kim et al. (2018) found related results on *all lemmas* overlapping between sentences. That study reported a significant positive correlation with essay scores for source-based essays (r=.14). That is, writing that requires the integration of source materials (e.g., extra reading and listening texts) but not for independent writing (r=.03) or composition based on writers' personal experience and knowledge. Similarly, the findings in this study may support the evidence reported by Crossley et al. (2016a), who found that *all lemmas* had a significant positive correlation with combined scores (r= .32). The same study reports positive correlations on the binary overlapping between sentences of all lemmas with organisation scores (r=.28). Their study did not find significant correlations for combined scores, nor did they report longitudinal development on all lemmas (binary) in L2 writing over a semester, however.

In addition to function words and all lemmas, significant weak correlations between *pronouns* overlapping at the sentence level and teachers' scores were found in this study (See sample essays 6.10 and 6.11 above). Weak correlations included pronoun lemmas overlapping with adjacent binary sentences (r= .15) and the overlap of pronouns in a two-sentence span (r= .13).

However, these findings are contrary to what Crossley et al. (2016a) found on pronouns in sentences, suggesting that the overlap between adjacent sentences had a significant negative correlation with organisation score (r=-.18). But neither their study found a correlation with combined scores (i.e., the overall quality of an essay) nor findings were reported on longitudinal development. Further, while Crossley et al. (2016a) found that pronouns between adjacent paragraphs

(binary) showed a significant correlation with the combined scores (r=.28), this does not appear to be the case in this study. That finding in this study was unexpected and suggested that L2 writers' use of pronouns to link ideas in adjacent sentences and a two-sentence span correlated with teachers' scores.

Yet although these findings may indicate that L2 teachers may have deemed pronouns as relevant cohesion items for the coherence and grading of essays, a note of caution is due here since these results and interpretations come from very weak correlations. Teachers likely considered higher judgements of writing quality based on the vast number of repeated pronouns found at the sentence level of essays, as proposed in Figures 6.10 and 6.11 above.

However, what is curious about this result is that L2 writers relied on repeating related pronouns (e.g., I, me, my, we) at the local level of text to cohere their ideas in essays. Unfortunately, these findings are rather difficult to interpret because correlations found in this study are very weak and because other elements beyond the presence of pronouns need to be considered as the cause for higher teachers' judgements of the writing quality of essays by L2 writers.

6.1.2 Summary of Correlational Findings in Essays

A series of Pearson correlation coefficient tests were computed to determine the linear relationship between cohesion features in text segments and the teachers' scores of essays composed by L2 writers in Ecuador.

Text Type	Cohesion Items	Specific Items	Paragraph		Sentence	
			Adjacent	Two-par. span	Adjacent	Two-sent. span
Essays	Lexical overlap	Adjective lemmas		✓*✓**		
		Function words		✓*	✓**	
		Pronouns	✓		✓**	✓
		Noun Lemmas	✓**			
		All lemmas			✓	
		Argument		✓*		
	Semantical similarity	Verb synonyms	✓			
		Noun synonyms	✓			

* Paragraph/sentence normed
** Binary

Table 6.12 – Correlational Findings in Essays

To recap, the results indicate that there were positive correlations between lexical cohesion features occurring at the paragraph level as well as the sentence level. In addition, the results show that there were positive correlations between semantical similarity features (e.g., synonymy) occurring at the paragraph level in essays by L2 writers. These correlational findings in text segments are summarised in Table 6.12 above.

6.2 Stepwise Regression Findings in Essays

A stepwise regression analysis aided this study in determining which cohesion variables were predictive of teachers' quality judgements. For the regression analysis, thirty independent variables that measure cohesion features were considered.

Stepwise regression analyses on thirty independent variables and grades from the essay dataset showed independence of residuals of 1.78 as assessed by the Durbin-Watson statistics. In addition, the results indicated homoscedasticity, as assessed by visually inspecting the plot of standardised residuals versus standardised predicted values. In addition, collinearity checks (e.g., VIF < 5 values or moderately correlated) suggest that high correlations between independent variables may not be a cause of concern.

Entry	Variable Added	R	r2	*B*	SE	*B*
1	adjacent two-paragraph overlap adjective lemmas (*)	0.29	0.88	0.55	0.15	0.22
2	adjacent paragraphs overlap pronoun lemmas	0.34	0.11	1.67	0.5	0.20
3	adjacent two-paragraph overlap content lemmas	0.36	0.13	-2.65.	1.22	-0.16
4	adjacent sentences overlap all lemmas	0.38	0.14	4.78	1.92	0.15
5	synonym overlap (paragraph, noun)	0.37	0.14	0.22	0.64	0.23
6	repeated content lemmas and pronouns	0.4	0.16	-5.1	2.37	-0.15

Notes: Estimated Constant Term is 7.213; B is unstandardised Beta; SE is standard error; B is standardised Beta. (*) paragraph normed.

Table 6.13 – Stepwise Regression Findings in Essays

The regression results indicated that six cohesion features were the best predictors of teachers' judgements of writing quality in essays. These six variables explained 16% of the variance (R2 =0.16)., F (6, 233) = 7.397, p < .001, and indicated that lexical cohesion features at the paragraph, sentence, and whole-text levels had the strongest association with teachers' judgements of quality in essays. (See Table 6.13 above for additional information).

In addition, predictors that may be significant in the model were examined further, indicating that:

- adjective lemmas (paragraph normed) overlapped in a two-paragraph span (t = 3.71, p = .001),
- pronouns overlapped between adjacent paragraphs (t = 3.35, p = .001),
- content lemmas overlapped in a two-paragraph span (t = -2.15, p = .032),
- all lemmas overlapped between adjacent sentences (t = 2.48, p = .014),
- noun synonyms between paragraphs (t = 3.48, p = .001), and
- repeated content and pronoun lemmas (i.e., givenness) occurring in the entire text (t = -2.14, p = .033) were significant predictors in the model.

These may indicate that lexical features (e.g., adjectives and pronouns) occurring at the paragraph level and lexical features (e.g., all lemmas) happening at the sentence level increased the teachers' scores in essays. Furthermore, semantical similarity features (e.g., noun synonyms) occurring between paragraphs seemed to positively influence the teachers' scores (i.e., increase). On the contrary, specific lexical features (e.g., content word lemmas) occurring at the paragraph level and repeated content and pronoun lemmas (i.e., givenness measures) occurring in the entire text seemed to lower the teachers' scores of essays. However, it is essential to note that the regression outcomes included mostly low R^2 measures and a single medium R^2 measure. These low results may have influenced the model (J. Cohen et al., 2013) and therefore need to be interpreted with caution.

6.2.1 Illustrating Regression Outcomes in Essay Samples

Perhaps, the most important finding from the stepwise regression analysis is that most lexical cohesion items overlapped at the paragraph level (e.g., adjective lemmas, pronouns, content lemmas, and noun synonyms), a handful at the

sentence level (e.g., all lemmas), and the entire text (repeated content and pronoun lemmas). The regression model showed items overlapping in a two-paragraph span, for example. Such predictors included adjective lemmas and content lemmas.

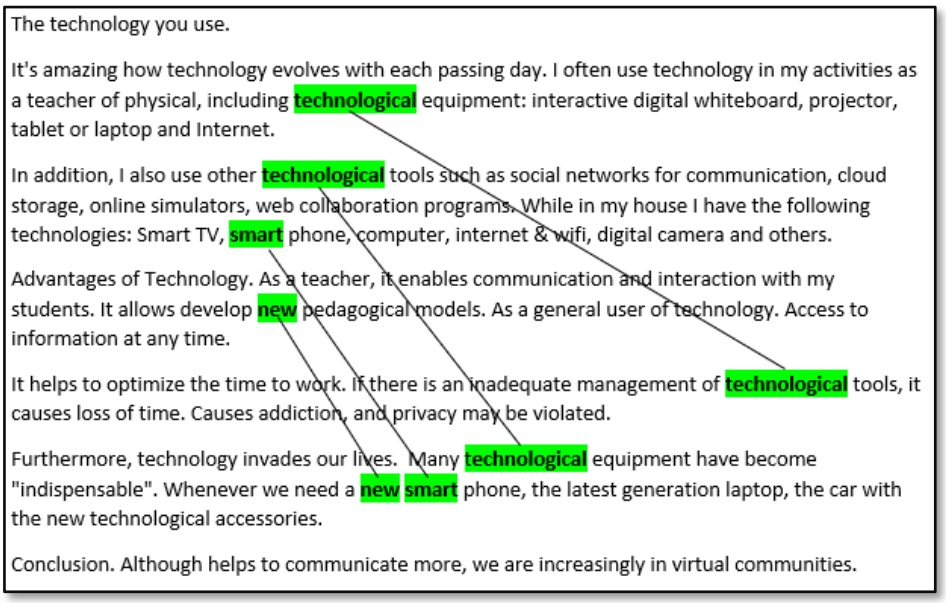
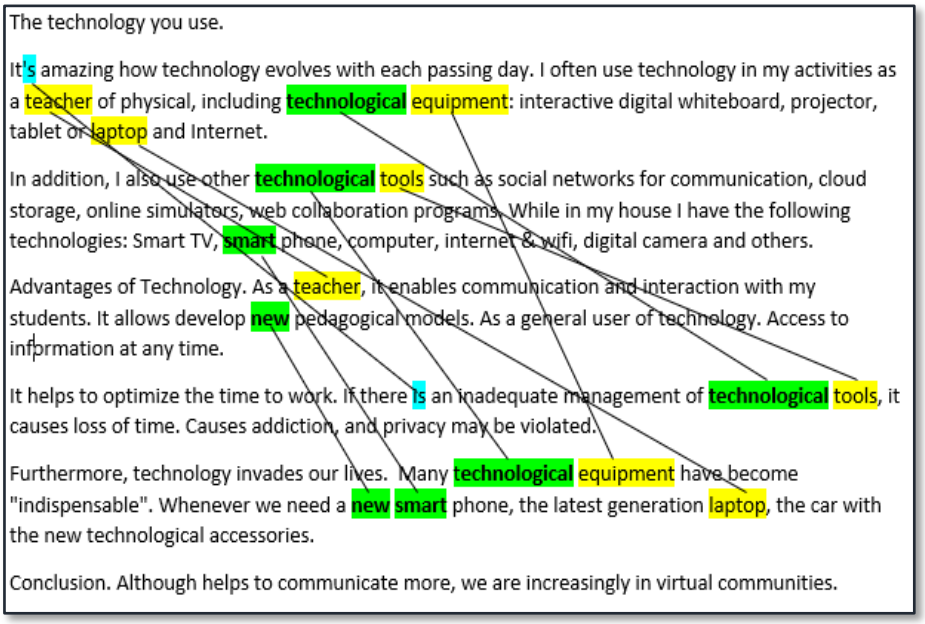


Figure 6.14 – Adjective Overlap in a Two-paragraph Span

According to the regression results, the predictor indicating the overlap of adjective lemmas in a two-paragraph span seems to increase the teachers' scores in essays (See Figure 6.14 above). However, this finding seems contrary to the result on the content lemmas predictor that indicates a negative relationship of content lemmas (verb, noun, and adjective) overlapping in a two-paragraph span with teachers' scores.

What is curious about this result is that the presence of content lemmas, including adjectives, decreases the teachers' grades in essays. The reason for this is not clear, but it may have something to do with the vast number of items comprising the content lemma predictor variable (e.g., verbs, nouns, adjectives) overlapping between paragraphs in essays. The vast number of these items may have caused a lowering in the grades as the frequency scores on these items suggest (e.g., 117 average). Adjective lemmas (highlighted in green) and content word lemmas (e.g., verbs in turquoise and nouns in yellow) overlapping in a two-paragraph span are shown in Figure 6.15.


The technology you use.

It's amazing how technology evolves with each passing day. I often use technology in my activities as a teacher of physical, including technological equipment: interactive digital whiteboard, projector, tablet or laptop and Internet.

In addition, I also use other technological tools such as social networks for communication, cloud storage, online simulators, web collaboration programs. While in my house I have the following technologies: Smart TV, smart phone, computer, internet & wifi, digital camera and others.

Advantages of Technology. As a teacher, it enables communication and interaction with my students. It allows develop new pedagogical models. As a general user of technology. Access to information at any time.

It helps to optimize the time to work. If there is an inadequate management of technological tools, it causes loss of time. Causes addiction, and privacy may be violated.

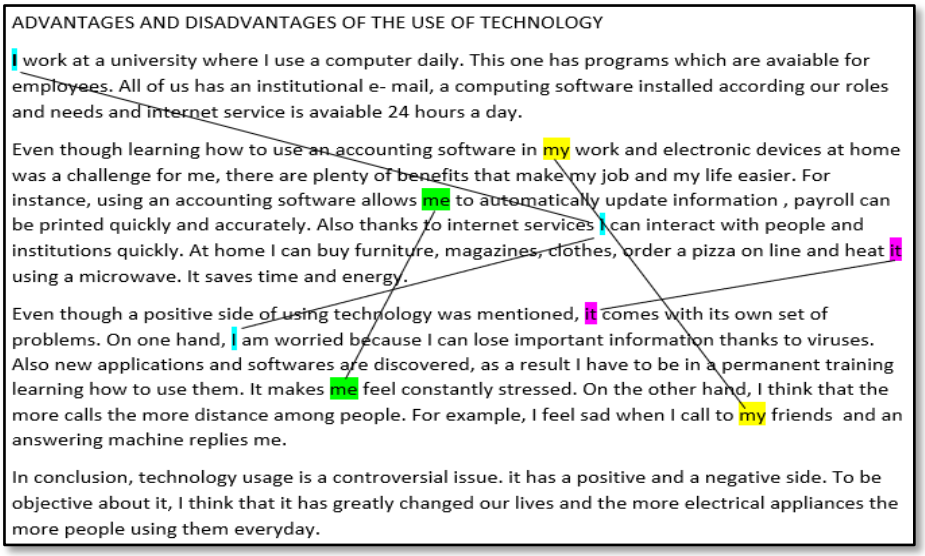
Furthermore, technology invades our lives. Many technological equipment have become "indispensable". Whenever we need a new smart phone, the latest generation laptop, the car with the new technological accessories.

Conclusion. Although helps to communicate more, we are increasingly in virtual communities.

Figure 6.15 – Content Words Overlap in a Two-paragraph Span

A possible explanation for this is that teachers may have considered that L2 writers overused lexical repetition to link paragraphs in essays. On the contrary, the limited incidence of adjective lemmas (e.g., eighteen average) occurring in larger segments of essays (i.e., paragraphs) may have caused a positive impression on teachers' judgements of writing quality for allocating higher grades.

Pronouns overlapping between adjacent paragraphs is another predictor related to higher scores in essays. Sample essay 6.16 illustrates the overlap of pronouns in adjacent paragraphs in an essay.


ADVANTAGES AND DISADVANTAGES OF THE USE OF TECHNOLOGY

I work at a university where I use a computer daily. This one has programs which are avaiable for employees. All of us has an institutional e- mail, a computing software installed according our roles and needs and internet service is avaiable 24 hours a day.

Even though learning how to use an accounting software in my work and electronic devices at home was a challenge for me, there are plenty of benefits that make my job and my life easier. For instance, using an accounting software allows me to automatically update information , payroll can be printed quickly and accurately. Also thanks to internet services I can interact with people and institutions quickly. At home I can buy furniture, magazines, clothes, order a pizza on line and heat it using a microwave. It saves time and energy.

Even though a positive side of using technology was mentioned, it comes with its own set of problems. On one hand, I am worried because I can lose important information thanks to viruses. Also new applications and softwares are discovered, as a result I have to be in a permanent training learning how to use them. It makes me feel constantly stressed. On the other hand, I think that the more calls the more distance among people. For example, I feel sad when I call to my friends and an answering machine replies me.

In conclusion, technology usage is a controversial issue. it has a positive and a negative side. To be objective about it, I think that it has greatly changed our lives and the more electrical appliances the more people using them everyday.

Figure 6.16 – Pronouns Overlapping Between Adjacent Paragraphs

Previous studies suggest contradictory findings on pronouns in L1 and L2 writing. On the one hand, the findings on pronouns in this study, for example, differ from the evidence on pronouns overlapping in adjacent sentences (Crossley et al., 2016a) in L1 writing. On the other, this finding may be consistent with that of Crossley et al. (2016a, 2016b), who found pronouns overlapping in a two-paragraph span in essays by L1 and L2 writers.

This outcome may add to the evidence on cohesion features at the paragraph level. However, what is interesting about this finding is that not all pronouns follow the same anaphoric referential, occurring between paragraphs. A closer inspection of Sample essay 6.16 above indicates that most pronouns link to the same reference occurring in the following paragraph (e.g., I, me, my). But not all personal pronouns had a straightforward relationship. While pronouns (e.g., I, me, my), for example, overlap with the same referential in adjacent paragraphs, the pronoun 'it' and the object pronoun 'them' belong to different referentials. These pronouns relate to each paragraph's different words (e.g., pizza, technology). Therefore, it is unlikely that all pronouns included in this variable (e.g., I, me, my, it, them) occurring between paragraphs predicted the teachers' grades.

In addition to lexical features, noun synonyms overlapping between paragraphs was another variable predicting teachers' scores in essays. Even though this finding may support evidence of a positive relationship between noun synonyms and teachers' scores in essays by L2 writers, this outcome is contrary to that of Crossley et al. (2016b), who found that verb synonym overlap at the sentence level predicted the grades in compositions by L1 writers.

On the one hand, these contrasting semantical similarity relationships may partly be explained by the writers' needs linked to meet the writing task's requirements. Perhaps, L1 writers included verb synonyms overlapping at the sentence level to ensure that their paragraphs were more cohesive and thus more coherent. On the other hand, L2 writers may have included noun synonyms between paragraphs to ensure that their ideas were intertwined between paragraphs. Similarly, correlational findings from previous studies seem to confirm that evidence, that is, L1 and L2 writers used noun and verb synonyms to help them connect similar ideas using synonyms at the sentence and paragraph levels (e.g.,

Crossley et al., 2016a, 2016b; Mirzapour & Ahmadi, 2011). This semantical similarity finding is illustrated in Figure 6.17.

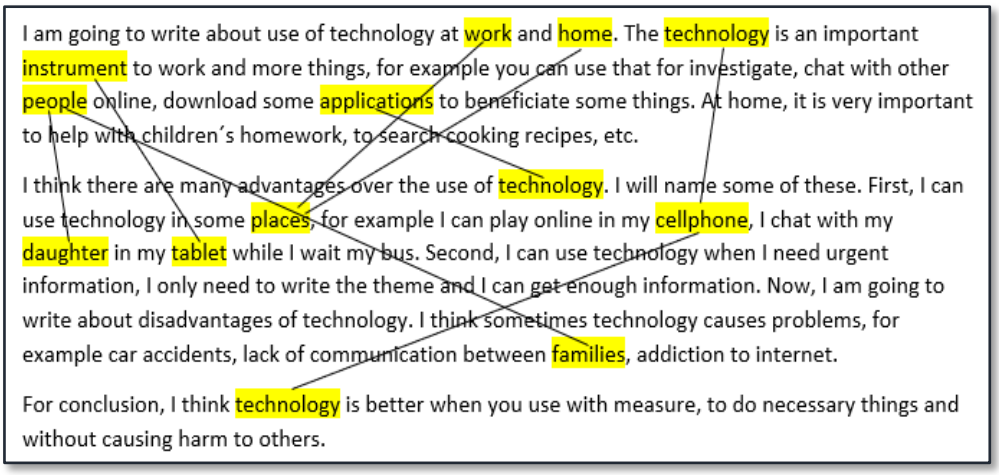


Figure 6.17 – Noun Synonyms Overlap in Paragraphs

Another interesting finding was that all lemmas overlapping between adjacent sentences positively predicted the teachers' scores in essays by L2 writers. A closer look at this regression outcome suggests that function and content lemmas (i.e., all lemmas) occurring at the sentence level increase the teachers' scores of essays. (See Sample essay 6.18.)

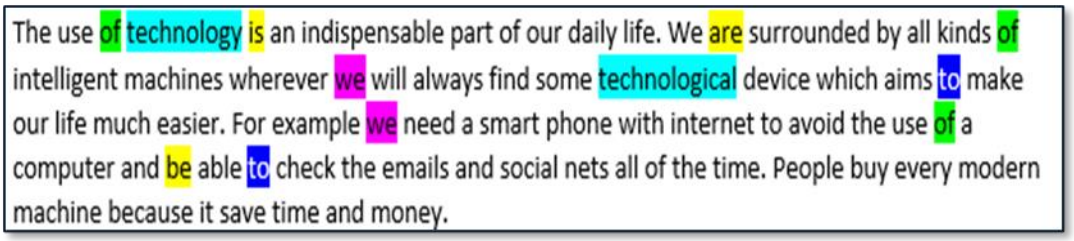
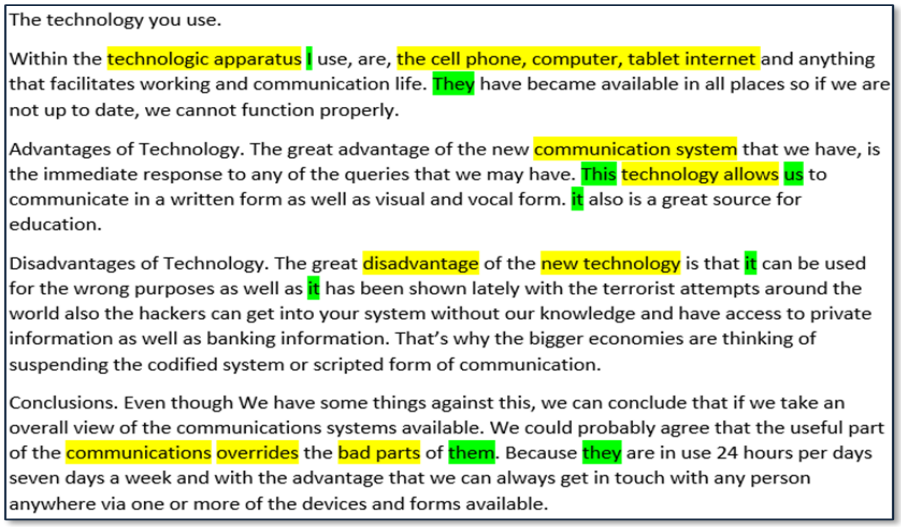


Figure 6.18 – All Lemmas Overlap Between Sentences

This finding is contrary to that of Crossley et al. (2016b), who found that all lemmas overlapping at the paragraph level influenced (i.e., positively increased) the grades in writing by L1 undergraduates. However, although this finding differs from Crossley et al. (2016b), the results in this study may be consistent with those of (e.g., Crossley et al., 2016a; M. Kim & Crossley, 2018), who found that the overlap of all lemmas at the sentence and paragraph level positively correlated with the writing scores by L2 writers.

Finally, the current study found that one givenness index occurring in the whole text negatively predicted L2 writing. It has been suggested that the amount of information that is recoverable from the preceding discourse (i.e., givenness) may aid in determining the overall text cohesion in L1 and L2 writing (e.g., Chafe, 1976; Crossley, Allen, Kyle & McNamara, 2014; Crossley & McNamara, 2012b; Halliday, 1967).

The givenness TAACO measure, which includes the repetition of content words and third-person pronouns at least once in a text, is exemplified in Figure 6.19.


The technology you use.

Within the technologic apparatus I use, are, the cell phone, computer, tablet internet and anything that facilitates working and communication life. They have became available in all places so if we are not up to date, we cannot function properly.

Advantages of Technology. The great advantage of the new communication system that we have, is the immediate response to any of the queries that we may have. This technology allows us to communicate in a written form as well as visual and vocal form. it also is a great source for education.

Disadvantages of Technology. The great disadvantage of the new technology is that it can be used for the wrong purposes as well as it has been shown lately with the terrorist attempts around the world also the hackers can get into your system without our knowledge and have access to private information as well as banking information. That's why the bigger economies are thinking of suspending the codified system or scripted form of communication.

Conclusions. Even though We have some things against this, we can conclude that if we take an overall view of the communications systems available. We could probably agree that the useful part of the communications overrides the bad parts of them. Because they are in use 24 hours per days seven days a week and with the advantage that we can always get in touch with any person anywhere via one or more of the devices and forms available.

Figure 6.19 – Givenness Features Overlapping in the Entire Text

Yet Durrant et al. (2021) notice that givenness measures (e.g., the ratio of pronouns to nouns, number of repeated content words and third-person pronouns) put cohesion automatic tools (e.g., TAACO and Coh-Metrix) at odds with the theory on cohesion developed by Halliday and Hasan (1976) who:

> "…explicitly argue that givenness is a structural, rather than cohesive, element. For Halliday and Hasan, cohesion relates specific elements in a text and there is no implication that all parts of a text are cohesively related. The given/new distinction, in contrast, applies to every part of a text – that is, everything is classified as either given or new." (Durrant et al., 2021, pp. 195-196).

With that in mind, this finding on givenness that is linked to data obtained in the analysis of cohesion features in essays by L2 writers may suggest that the presence of repeated content lemmas and pronouns throughout the text reduced the teachers' scores. On the one side, this unexpected outcome proposes that

givenness measures can negatively be associated with the teachers' judgements of writing quality by L2 writers in Ecuador.

On the other side, this outcome is contrary to that of Crossley et al. (2016b), who found that the givenness measures on repeated content lemmas and pronouns occurring in the entire text positively correlated with the teachers' scores of essay quality and teachers' scores of coherence in essays by L2 writers. The finding in this study may also contradict that givenness indices positively relate to measures of text coherence found in previous studies on L1 writing (e.g., Crossley & McNamara, 2011b, 2011c).

6.2.2 Summary of Regression Findings in Essays

This section presented the regression findings on cohesion features that best predicted the teachers' scores in emails. The results suggest that lexical, semantical, and givenness features occurring in different text segments positively and negatively predicted the teachers' scores. The indexes that positively predicted the teacher's scores in essays included adjective lemmas (paragraph normed) overlapping in a two-paragraph span, pronouns between adjacent paragraphs, all lemmas between adjacent sentences as well noun synonyms between paragraphs.

On the contrary, indexes that negatively predicted the teachers' scores in essays included content lemmas overlap in a two-paragraph span and repeated content and pronoun lemmas (i.e., givenness) occurring in the entire text. Table 6.20 summarises these findings.

Text Types	Textual Features	Specific items	Paragraph		Sentence	Entire Text
			Adjacent	Two Parag.	Adjacent	
Essays	Lexical overlap	Adjectives		✓*		
		Pronouns	✓			
		Content words		✓		
		All lemmas			✓	
	Semantical similarity	Noun synonym	✓			
	Givenness	Content words & pronouns				✓
* Paragraph normed						

Table 6.20 – Summary of All Predictors on Cohesion in Essays

6.3 Correlational Findings in Emails

As in the essay dataset, a series of Pearson correlations between independent variables that measure cohesion features and teachers' judgements of quality were conducted on the email dataset. The most important findings indicate that weak correlations signal the relationship between teachers' scores with lexical overlap and semantical similarity items in sentences and paragraphs in emails by L2 writers in Ecuador. Those items included nouns, verbs, pronouns, and content words overlapping with adjacent paragraphs and sentences, as well as semantical similarity features (e.g., noun and verb synonyms, LSA) occurring exclusively at the paragraph level. These findings are summarised in Table 6.21.

Indexes	*r*
binary adjacent paragraph overlap noun lemmas	.252**
synonym overlap (paragraph, noun)	.246**
binary adjacent paragraph overlap verb lemmas	.237**
LSA cosine similarity (adjacent paragraphs)	.194**
binary adjacent paragraph overlap pronoun lemmas	.193**
adjacent two-paragraph overlap noun lemmas	.175**
binary adjacent two-sentence overlap noun lemmas	.147*
synonym overlap (paragraph, verb)	.147*
binary adjacent paragraph overlap content,	.135*
*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).	

Table 6.21 – Correlational Findings in Emails

Particularly, these results suggest a weak relationship between teachers' scores and lexical overlap items (e.g., nouns, verbs, pronouns, and content words) occurring at the paragraph level. Those weak correlations, which were associated with higher grades, included:

- binary adjacent paragraph overlap of *noun* lemmas (r(240) = .252, p = .001),
- binary adjacent paragraph overlap of *verbs* (r(240) = .237, p = .001),
- binary adjacent paragraph overlap of *pronouns* (r(240) = .193, p = .003),
- adjacent paragraph overlap of nouns occurring in a two-paragraph span (r(240) = .175, p = .007), and

- adjacent paragraph overlap binary of *content words* (r(240) = .135, p = .037).

Additionally, the correlational results suggested a very weak relationship between teachers' scores and semantical similarity items (e.g., noun and verb synonyms and LSA measures) at the paragraph level of emails. Such correlations, associated with higher grades, included:

- noun synonyms overlapping between paragraphs (r(240) = .246, p = .001),
- LSA cosine similarity in paragraphs (r(240) = .194, p = .003), and
- verb synonyms overlapping between paragraphs (r(240) = .147, p = .023).

A weak correlation was also found to indicate a relationship between teachers' scores and nouns at the sentence level of emails. It included the binary adjacent overlap of nouns occurring in a two-sentence span (r(240) = .147, p = .022). A list of all correlational outcomes is included in Appendix IV.

6.3.1 Illustrating the Correlational Outcomes in Email Samples

The correlational findings indicate that lexical and semantical features occurring in sentences and paragraphs correlated with teachers' judgements of writing quality in emails by L2 writers. Lexical items in emails included nouns, verbs, pronouns, and content lemmas overlapping in adjacent paragraphs. Nouns (in yellow) and verbs (in green) overlapping between adjacent paragraphs are presented in Figure 6.22.

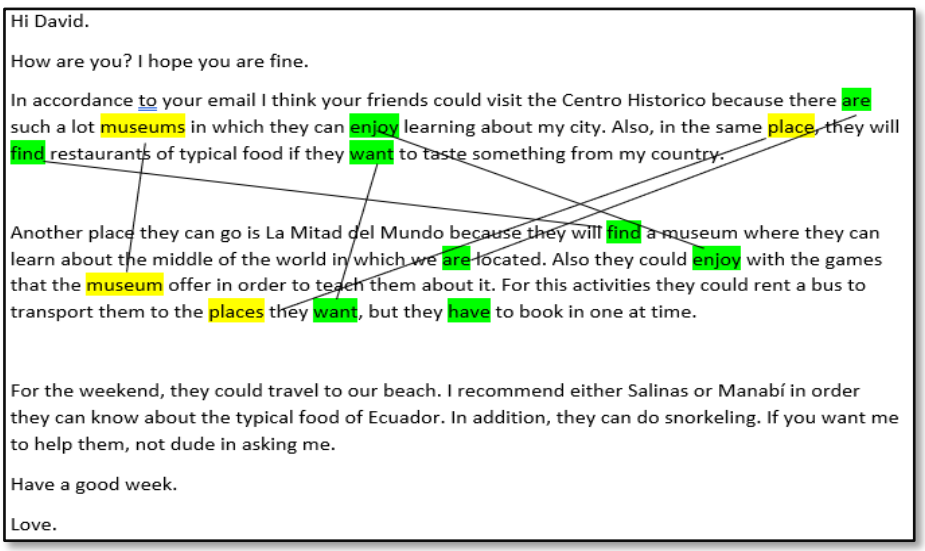


Figure 6.22 – Noun and Verb Overlap in Adjacent Paragraphs

More importantly, those weak correlational findings on nouns and verbs highlighted in yellow and green in Figure 6.22 above suggest that lexical features in adjacent paragraphs may positively be associated with the teachers' scores of emails.

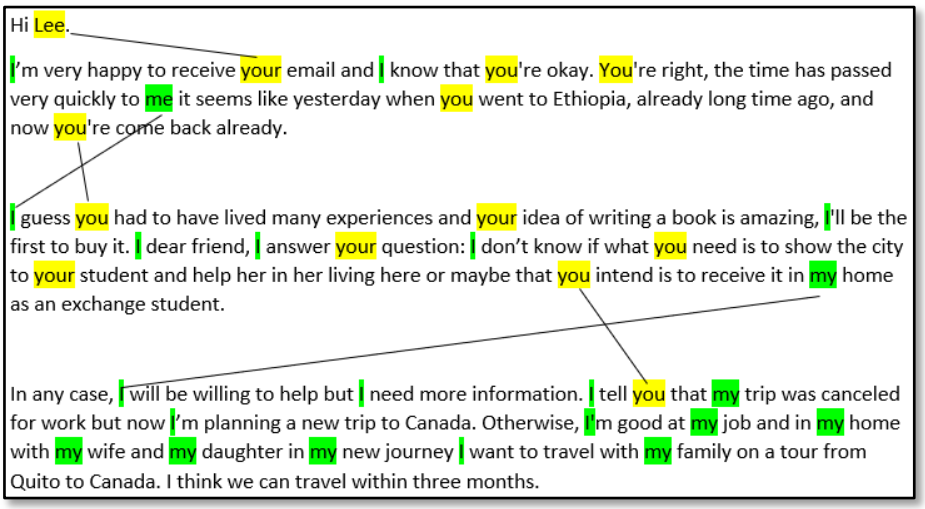


Figure 6.23 – Pronouns Overlap Between Paragraphs

These results that have not previously been described may be consistent with that of Crossley et al. (2016a), who found that nouns, verbs, and pronouns (binary) in a two-paragraph span correlated with teachers' scores of writing quality. However, the current findings indicate that lexical items in emails by L2 writers were found not to overlap in a two-paragraph span. Instead, these findings suggest that L2 writers include lexical items (e.g., nouns, verbs, pronouns, and content lemmas) that overlap between adjacent paragraphs in emails. Those items are illustrated in Figures 6.22 – 6.23 above.

In addition to nouns, verbs, and pronouns, content words weakly correlated with teachers' scores. These results suggest that L2 writers used words that carry meaning between adjacent paragraphs to cohere emails. Similarly, although this result has not previously been described, this outcome may be compared to that of Guo et al. (2013), who found a negative correlation of content word overlap (although their study did not specify any text segment) in essay examination (e.g., TOEFL independent writing section) by L2 writers. The outcome of content lemmas overlapping in adjacent paragraphs is highlighted in Figure 6.24.

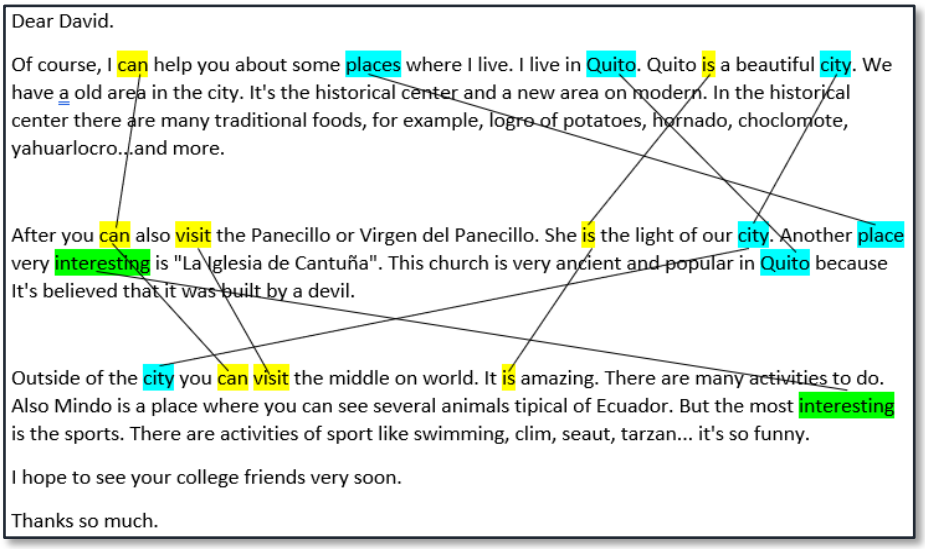


Figure 6.24 – Content Lemmas Overlapping Between Paragraphs

More relevant, these rather contradictory results may be due to particular differences. Therefore, it is possible that if the inclusion of content words happens at the local or global levels of essays, scorers may have deemed those texts as very cohesive. On the contrary, this study found that the inclusion of content words between paragraphs may reflect the L2 writers' ability to keep the readers' attention. This element seems to have been considered by L2 teachers allocating higher grades in emails by L2 writers.

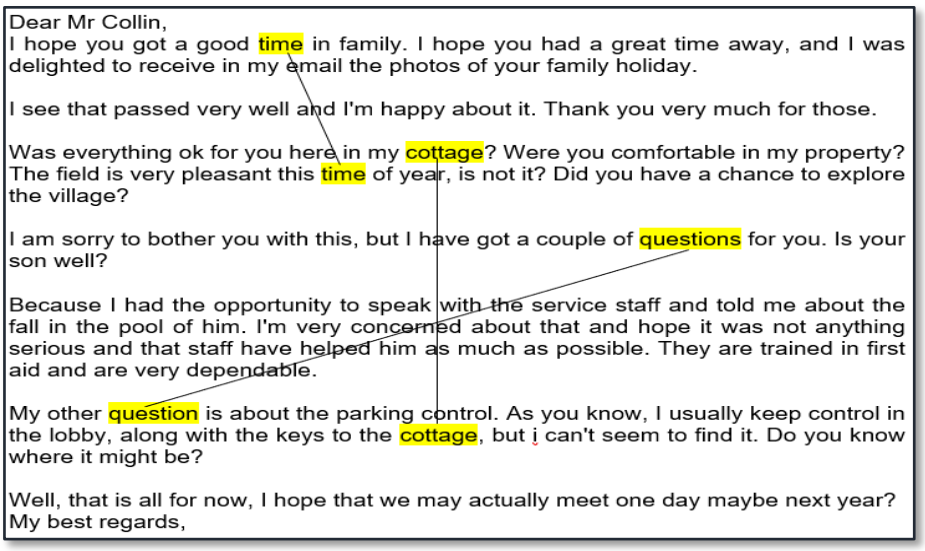


Figure 6.25 – Noun Lemmas Overlapping in a Two-paragraph Span

Another important finding was that nouns overlapping in a two-paragraph span weakly correlated with the teachers' scores (See Sample email 6.25 above). The

weak association of nouns overlapping at the paragraph level is interesting, but not surprising. This outcome described earlier, that is, nouns overlapping between adjacent paragraphs, may indicate that nouns overlapping in a two-paragraph span also correlated with teachers' scores in emails by L2 writers.

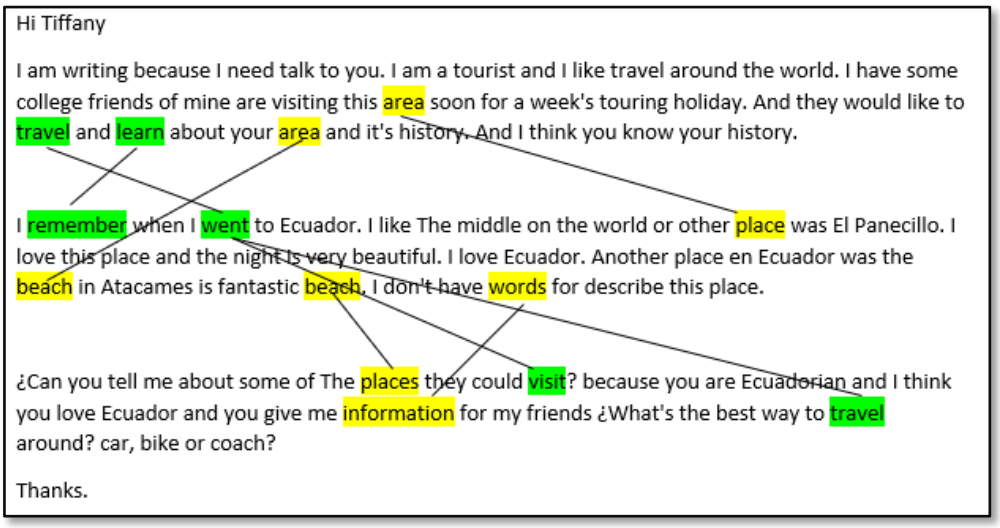


Figure 6.26 – Noun and Verb Synonyms Overlap Between Paragraphs

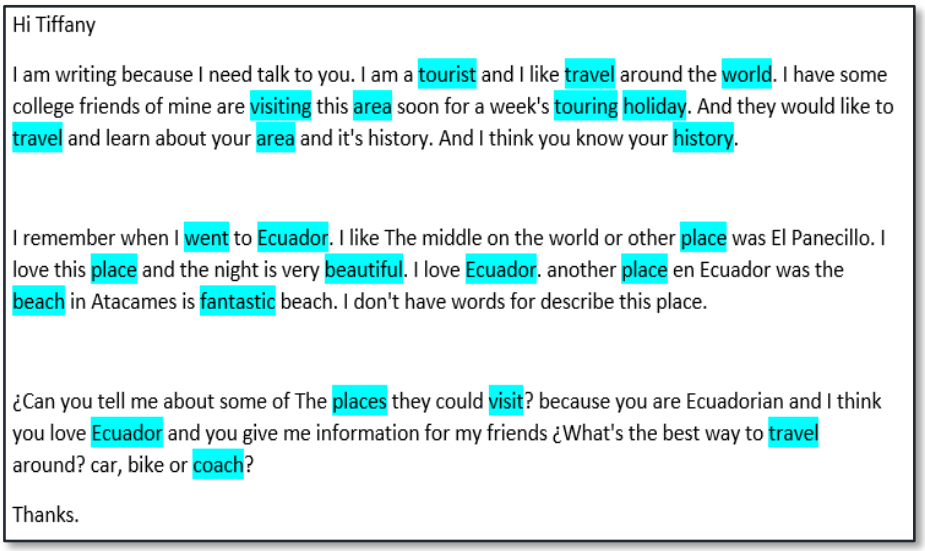
One more finding indicates that teachers' scores weakly correlated with noun and verb synonyms overlapping between paragraphs of emails by L2 writers in Ecuador. These were interesting findings because previous evidence on emails by L2 writers is scarce. See these semantical similarity features illustrated in green for verb synonyms and yellow for noun synonyms in figure 6.26.

However, these findings that show evidence of cohesion in emails may be somewhat limited by the weak correlational outcomes. Such results may be compared with that of Crossley et al. (2016a), who also found weak correlations of noun synonyms overlapping between paragraphs with organisation score (r=.19) and a combined rating of essays (r=.22) as well as with low and moderate correlations between verb synonyms overlapping between paragraphs with organisation score (r=.27) and a combined score of (r=.33) in essays by L2 writers.

Although these results reflect those of Crossley et al. (2016a, 2016b), who found that there is a positive relationship between teachers' scores and verb and noun synonyms in essays by L1 and L2 writers, the findings in this study may provide support for furthering the analysis of semantical similarity features in additional

types of texts (e.g., articles, reports, reviews) required for L2 instruction at the B2 level as suggested by the CEFR standards.

Another interesting finding was that latent semantic analysis (LSA) cosine similarity in paragraphs weakly correlated with the teacher's scores of emails by L2s in Ecuador. The findings reported here suggest that the semantical similarity underlying lexical items (e.g., nouns and verbs) aided in determining the degree to which adjacent paragraphs in a sample email are conceptually similar (see Lu, 2014, p. 162). Specifically, the LSA cosine similarity variable indicates the similarity of words closely related between paragraphs in an email. See those words (e.g., travel, holiday, place) highlighted in turquoise in Sample email 6.27.



Hi Tiffany

I am writing because I need talk to you. I am a tourist and I like travel around the world. I have some college friends of mine are visiting this area soon for a week's touring holiday. And they would like to travel and learn about your area and it's history. And I think you know your history.

I remember when I went to Ecuador. I like The middle on the world or other place was El Panecillo. I love this place and the night is very beautiful. I love Ecuador. another place en Ecuador was the beach in Atacames is fantastic beach. I don't have words for describe this place.

¿Can you tell me about some of The places they could visit? because you are Ecuadorian and I think you love Ecuador and you give me information for my friends ¿What's the best way to travel around? car, bike or coach?

Thanks.

Figure 6.27 – LSA Cosine Similarity in Paragraphs

What is curious about this result is that through mathematical calculations (e.g., cosine similarity), this LSA finding may illuminate underlying document relationships. As the degree of involvement of the document (e.g., in sentences and paragraphs) or term that occurs in a corresponding concept.

A note of caution is due here since this finding on LSA indicates a very weak correlation with the teachers' scores of emails. Additionally, other factors beyond LSA measures may have influenced the teachers' scores. Therefore, this finding needs to be interpreted with caution.

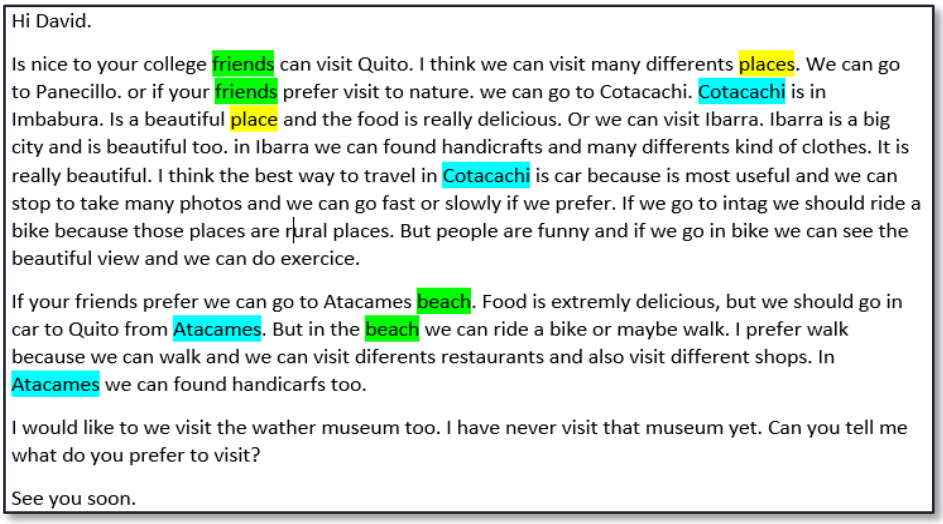
Perhaps, this finding broadly supports the work of previous studies on cohesion linking LSA measures with teachers' judgements of writing quality in L1 and L2

writing. In particular, this finding shows similarities with data obtained in the analysis of essays by L2 writers. Crossley et al. (2016a), for example, found a significant positive correlation between LSA initial to final paragraph with organisation score (r=.29), but a significant negative correlation between LSA initial to middle paragraph (r=-.16). More specifically, their study found a negative correlation between LSA initial to final paragraph with combined score (r=-.25) and a significant positive correlation with combined score (r=.23).

Moreover, the finding in this study may also be consistent with that of Crossley and McNamara (2011b). They found that LSA measures occurring in text segments (e.g., initial to middle paragraphs, middle paragraphs to the final paragraph, and initial paragraph to final paragraph) correlated with raters' judgements of text coherence in essays by L1 writers. Similarly, the findings in this study may be related to Crossley et al. (2019), who found that LSA significantly correlated with ratings of text coherence in L1 writing.

This outcome may also be contrasted to that of Green (2012), who compared the amount of given semantic information in essays by L2 writers and L1 writers. Green found a progressive linear decline in the amount of LSA information across the sentences as proficiency increased toward L1 writing norms. Lastly, it can thus be suggested that LSA measures signal the hidden meaning of lexical items occurring mainly at the global level (e.g., paragraph) of texts produced by L1 and L2 writers.

One last finding suggests that the adjacent binary overlap of nouns occurring in a two-sentence span had a weak correlation with teachers' scores in emails. Not only this finding may support the idea of lexical items as contributors to textual coherence occurring at the sentence level, but also this finding on noun lemmas at the sentence level may contribute to the coherence of emails. However, whilst this result has not previously been described, a study by Crossley et al. (2016a) showed that noun lemmas overlapping between paragraphs positively correlated with raters' scores in essays by L2 writers. (See nouns highlighted in various colours overlapping at the sentence level in Sample email 6.28).



Hi David.

Is nice to your college friends can visit Quito. I think we can visit many differents places. We can go to Panecillo. or if your friends prefer visit to nature. we can go to Cotacachi. Cotacachi is in Imbabura. Is a beautiful place and the food is really delicious. Or we can visit Ibarra. Ibarra is a big city and is beautiful too. in Ibarra we can found handicrafts and many differents kind of clothes. It is really beautiful. I think the best way to travel in Cotacachi is car because is most useful and we can stop to take many photos and we can go fast or slowly if we prefer. If we go to intag we should ride a bike because those places are rural places. But people are funny and if we go in bike we can see the beautiful view and we can do exercice.

If your friends prefer we can go to Atacames beach. Food is extremly delicious, but we should go in car to Quito from Atacames. But in the beach we can ride a bike or maybe walk. I prefer walk because we can walk and we can visit diferents restaurants and also visit different shops. In Atacames we can found handicarfs too.

I would like to we visit the wather museum too. I have never visit that museum yet. Can you tell me what do you prefer to visit?

See you soon.

Figure 6.28 – Noun Overlap in a Two-sentence Span

Similarly, Guo et al. (2013) found a positive correlation between noun lemmas without specifying whether they overlapped between sentences or paragraphs. However, as indicated earlier, those differ from the finding presented here, which shows a very weak correlation between nouns overlapping in a two-sentence span and the teachers' judgements of writing quality in emails by L2 writers.

6.3.2 Summary of Correlational Findings in Emails

The findings in this section suggest that cohesion features positively correlated with teachers' scores of emails. Although the results were based on very weak correlations, the findings indicate that L2 writers included lexical overlap and semantical similarity features to help build meaning relationships at the paragraph and sentence level of emails. See Table 6.29.

Text Types	Cohesion Features	Specific Items	Paragraph		Sentence
			Adjacent	Two-paragraph span	Two-sentence span
Emails	Lexical overlap	Noun Lemmas	✓**	✓	✓**
		Verb lemmas	✓**		
		Pronouns	✓**		
		Content lemmas	✓**		
	Semantical similarity	Noun synonyms	✓		
		Verb synonyms	✓		
		LSA	✓		
**** Binary measure**					

Table 6.29 – Correlational Findings in Emails

6.4 Stepwise Regression Findings in Emails

Like in the analysis of essays, a stepwise regression analysis was conducted to examine which variables were predictive of teachers' judgements of quality in emails. Teachers' scores (i.e., dependent variable) along with twenty-two independent variables were included in the stepwise regression analysis.

The initial results indicated that residuals might have a positive autocorrelation as assessed by a Durbin-Watson statistic of 1.077. In addition, the results indicate that there was homoscedasticity as assessed by visually inspecting the plot of standardised residuals versus standardised predicted values. VIF < 5 values indicated that there was no multicollinearity in the variables measuring cohesion in emails.

After checking assumptions, perhaps, the most salient finding is that three lexical cohesion features (nouns, verbs, and content words) overlapping between paragraphs predicted the teachers' judgements of quality in emails by L2 writers.

These three indexes explained 10.3% of the variance (R2 =0.103)., F (3, 236) = 9.049, p < .001. Those indices, regarded as significant predictors of the teachers' judgements of quality or grades in emails, involved lexical features that contributed to text cohesion by linking ideas at the paragraph level. (See Table 6.30 for additional information).

Entry	Variable Added	R	r2	*B*	SE	*B*
1	binary adjacent paragraph overlap noun lemmas	0.25	0.64	1.16	0.34	0.26
2	binary adjacent paragraph overlap verb lemmas	0.28	0.81	1.4	0.44	0.29
3	binary adjacent paragraph overlap content lemmas	0.32	0.1	-1.2	0.51	-0.2

Notes: Estimated Constant Term is 7.830; B is unstandardised Beta; SE is standard error; B is standardised Beta.

Table 6.30 – Linear Regression Findings in Emails

Additionally, the individual predictors were examined further, suggesting that noun lemmas binary overlapping in adjacent paragraphs (t = 3.38, p = .001) and verb lemmas binary overlapping between adjacent paragraphs (t = 3.18, p = .002)

significantly and positively predicted the teachers' scores. On the contrary, content lemmas binary overlapping between adjacent paragraphs (t = -2.42, p = .016) was a negative predictor in the model.

6.4.1 Illustrating the Regression Outcomes in Emails

This section illustrates, discusses, and links the current findings with previous studies. More relevant, the overlap of noun, verb and content lemmas found in this study suggest that L2 writers connected ideas between paragraphs. These findings may help answer the second research question, which sought to determine the relationship between cohesion features and teachers' judgements of writing quality in emails.

One finding shows that noun lemmas binary overlap between adjacent paragraphs contributed to the increase in teachers' grades of emails. However, although this predictor has not previously been described, previous research indicates a correlation between teachers' scores and noun lemmas overlapping between paragraphs in texts composed by L2 writers. Crossley et al. (2016a) found a correlation between noun lemmas overlapping in a two-paragraph span and the teachers' scores in essays by L2 writers. Noun lemmas overlapping between paragraphs are illustrated in Sample email 6.31.

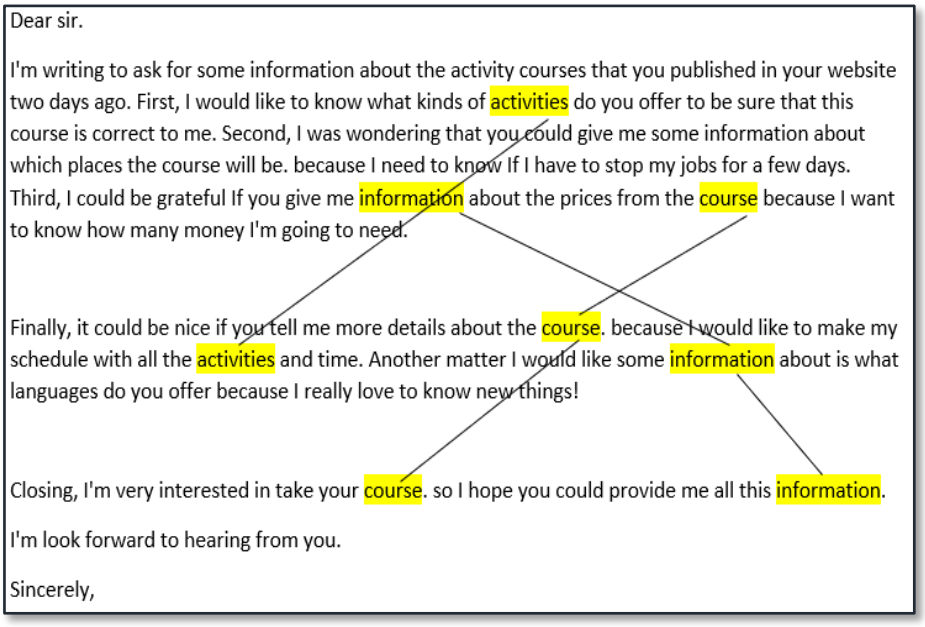
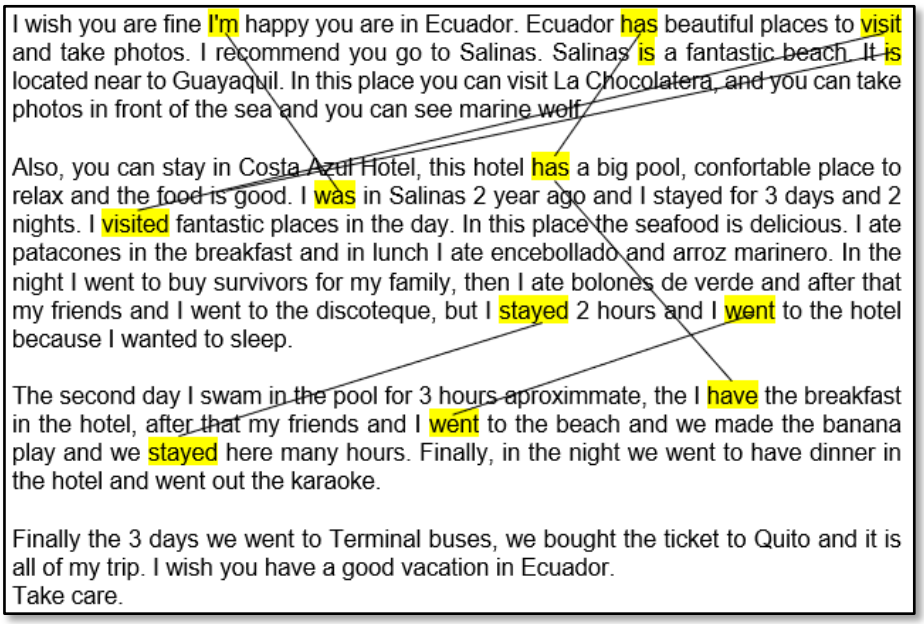


Figure 6.31 – Noun Lemmas Overlap Between Paragraphs

Another important finding is that verb lemmas binary overlap between adjacent paragraphs predicted the teachers' judgements of writing quality in emails. Once more, this finding has not been previously described.

However, this result may be consistent with that of Crossley et al. (2016b), who found that verb lemmas adjacent binary overlap in a two-paragraph span was a good predictor of teachers' scores of essays by L1 writers. Similarly, the finding on verb overlap in this study may also be consistent with data obtained by Crossley et al. (2016a), who found that verbs overlapping between paragraphs correlated with the teachers' scores of essays by L2 writers. Verb lemmas overlapping between paragraphs are illustrated in Sample email 6.32.


I wish you are fine I'm happy you are in Ecuador. Ecuador has beautiful places to visit and take photos. I recommend you go to Salinas. Salinas is a fantastic beach. It is located near to Guayaquil. In this place you can visit La Chocolatera, and you can take photos in front of the sea and you can see marine wolf.

Also, you can stay in Costa Azul Hotel, this hotel has a big pool, confortable place to relax and the food is good. I was in Salinas 2 year ago and I stayed for 3 days and 2 nights. I visited fantastic places in the day. In this place the seafood is delicious. I ate patacones in the breakfast and in lunch I ate encebollado and arroz marinero. In the night I went to buy survivors for my family, then I ate bolones de verde and after that my friends and I went to the discoteque, but I stayed 2 hours and I went to the hotel because I wanted to sleep.

The second day I swam in the pool for 3 hours aproximmate, the I have the breakfast in the hotel, after that my friends and I went to the beach and we made the banana play and we stayed here many hours. Finally, in the night we went to have dinner in the hotel and went out the karaoke.

Finally the 3 days we went to Terminal buses, we bought the ticket to Quito and it is all of my trip. I wish you have a good vacation in Ecuador.
Take care.

Figure 6.32 – Verb Lemmas Overlapping Between Paragraphs

This outcome may also be related to that of Tian et al. (2021), who found that verb lemmas overlapping between *sentences* predicted production composite scores in essays by L2 writers. Tian's et al. findings suggest that the inclusion of more verbs, adjectives, and pronouns tended to be related to L2 writers producing less amount of text.

One final finding is that *content word lemmas binary overlap between adjacent paragraphs* negatively predicted the teachers' judgements of writing quality in emails. This regression finding was unexpected and suggests that content lemmas overlapping at the paragraph level lowered the teachers' scores in

emails. A possible explanation for this might be that L2 teachers consider using commonplace content words between paragraphs redundant. As a result, L2 teachers allocated lower grades in emails. In that respect, Green (2012) found that in comparison to L1 writing, L2 higher and lower proficiency groups used more commonplace content words in their compositions.

However, whilst this result has not previously been described, it is encouraging to compare this figure with that found by Crossley et al. (2016b), who found a negative correlation of content word lemmas overlapping between *sentences* in the essays by L1 writers. Crossley and McNamara (2012b) reported similar outcomes. They found a negative correlation between content words and raters' scores of essays composed by high school L2 writers. Content words overlapping between paragraphs are illustrated in sample email 6.33.

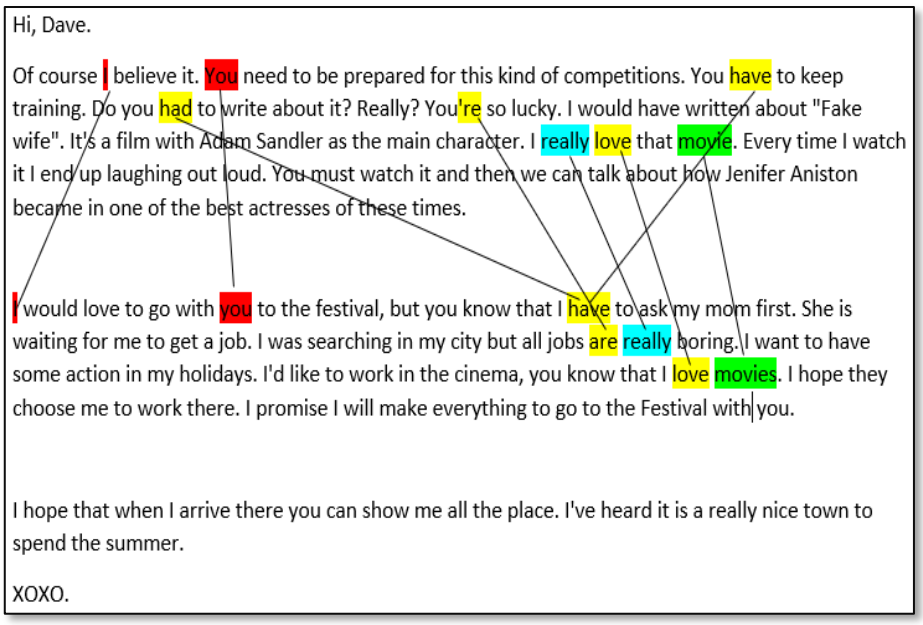


Figure 6.33 – Content Lemmas Overlapping Between Paragraphs

To sum up, three indexes that measure the lexical overlap between adjacent paragraphs were the best predictors of teachers' scores in emails by L2 writers in Ecuador. Noun and verb lemmas seem to have increased the scores whilst content lemmas decreased the teachers' scores. All three predictors were binary measures, that is, measures that calculated the number of adjacent paragraphs along with any overlapping item (e.g., nouns, verbs, content words) occurring in emails. These predictors are summarised in Table 6.34.

Text Type	Textual Feature	Specific Items	Adjacent Paragraph
Emails	Lexical overlap	Noun lemmas	✓*
		Verb lemmas	✓*
		Content lemmas	✓*
* Binary measures			

Table 6.34 – Summary of Predictors of Teachers' Scores in Emails

6.5 Summary of Findings

This chapter presented the correlational and regression findings aimed to determine the types of cohesion features in text segments and explored the relationship between cohesion features and teachers' quality judgements in the collected essays and emails composed by L2 writers in Ecuador.

In addition, it presented the procedures followed and aimed to meet various statistical assumptions (e.g., Cronbach's alpha, PCA, VIF values). Once assumptions were met, a reduced number of indexes were used to help find answers to the research questions posed for the study. For example, to answer the first research question that sought to determine the types of cohesion features occurring in text segments of the collected texts, correlational findings suggested that L2 writers included cohesion features (e.g., lexical overlap, semantical similarity, givenness) that overlap at the sentence, paragraph, and the entire text of essays and emails. These data were interpreted with caution not only because correlation does not imply causation but also because correlational findings were extremely weak.

Particularly, positive and negative weak correlations suggested a relationship between teachers' scores and the overlapping of textual items mainly occurring at the paragraph level, at the sentence, and the entire text of essays and emails. In addition, to better understand the details underlying each correlational finding, texts randomly selected were used to illustrate the relations between teachers' scores and cohesion features in essays and emails. The illustration of indexes correlating with teachers' scores in essays and emails aided in understanding better the strengths and limitations of measuring cohesion in L2 writing. As in corroborating the limited number of cohesion features (e.g., adjectives and adverbs overlapping in text segments) and providing a clearer understanding of

cohesion features (e.g., verbs, nouns, adverbs, adjectives) overlapping in text segments found in essays and emails. A summary of all correlational outcomes found in this study is presented in Table 6.35.

Text Types	Cohesion Features	Specific Items	Paragraph		Sentence	
			Adjacent	Two-paragraphs	Adjacent	Two-sentences
Essays	Lexical overlap	Adjectives		✓*✓**		
		Function words		✓*	✓**	
		Pronouns	✓		✓**	✓
		Noun	✓**			
		All lemmas			✓	
		Argument		✓*		
	Semantic similarity	Verb synonyms	✓			
		Noun synonym	✓			
Emails	Lexical overlap	Nouns	✓**	✓		✓**
		Verbs	✓**			
		Pronouns	✓**			
		Content words	✓**			
	Semantic similarity	Noun synonym	✓			
		Verb synonym	✓			
		LSA	✓			

* Paragraph normed
** Binary measure

Table 6.35 – Summary of Correlational Findings in Essays and Emails

Moreover, this chapter presented the regression findings to answer further the first and second research questions, which sought to determine which cohesion features occurring in different segments better predicted the teachers' judgements of writing quality in L2 writing.

Ultimately, the regression outcomes suggested that lexical overlap, semantical similarity, and givenness features occurring mainly at the paragraph level and the sentence and the entire text were the best predictors of teachers' scores of essays. However, only three indexes related to lexical overlap occurring at the paragraph level seem to be the best predictors of teachers' scores in emails by L2 writers in Ecuador. Such regression outcomes are summarised in Table 6.36.

Text Type	Textual Features	Specific items	Paragraph		Sentence	Entire Text
			Adjacent	Two-paragraphs	Adjacent	
Essays	Lexical overlap	Adjectives		✓*		
		Pronouns	✓			
		Content words		✓		
		All lemmas			✓	
	Semantic similarity	Noun synonym	✓			
	Givenness	Content word / pronouns				✓
Emails	Lexical overlap	Noun lemmas	✓**			
		Verb Lemmas	✓**			
		Content words	✓**			

* Paragraph normed

** Binary measure

Table 6.36 – Summary of Regression Findings in Essays and Emails

Findings on Connectives in L2 Writing

7.0 Introduction

This section presents the findings on connectives in essays and emails by L2 writers. Unlike the previous results that included variables for the analysis of texts in different text segments, this chapter focuses on TAACO variables measuring connective words in the entire text. Along with presenting descriptive statistical figures, the first part of the chapter describes procedures (e.g., coefficient alpha, VIF, PCA) aimed to meet assumptions required for furthering inferential statistics (e.g., linear regression). More relevant, this chapter hinges on presenting the outcomes that can aid in answering the third research question posed for this thesis. As in reporting the statistical evidence on the use of specific connective words (e.g., and, but, although) suggested by the CEFR standards for the teaching, learning, and assessment of L2 writing at the B2 level, as well as finding out whether connectives were associated with the quality of L2 writing.

7.1 Connectives in Essays

7.1.1 Descriptive statistics on Connective Measures in Essays

The analysis of essays included the automatic identification of 243 unique connective words and phrases clustered in twenty-five indexes. To determine whether specific connective words (e.g., and, but, although) were used by L2 writers, other automatic analysers helped this study identify connective words described in the TAACO manual (Crossley et al., 2016b).

Specifically, along with TAACO, extra automatic tools aided this study to identify individual connective words in L2 writing. Such NLP tools included NVivo (2020), TextInspector (2018) (e.g., Bax et al., 2019), the English Vocabulary Profile (EVP) (Capel, 2010; Saville & Hawkey, 2010), and SkELL (Baisa & Suchomel, 2014). The NVivo (2020) software, for example, allowed this study to identify and quantify different types of connectives in the data. Further identification of connectives enabled this study to obtain frequencies per 10k words, cumulative frequencies, cumulative percentages, and measures showing the number of connectives in each text. TAACO indexes, their constituents, and examples developed by Crossley et al.(2016b) are presented in Table 7.1.

Connective Index	Number of Constituents	Examples
basic connectives	7	for, and, nor, but, or, yet, so
conjunctions	2	and, but
disjunctions	1	or
lexical subordinators	18	after, although, while
coordinating conjuncts	5	yet, so, nor, however, therefore
addition	12	and, also, besides
sentence linking	29	nonetheless, therefore, although,
order	12	to begin with, next, first, firstly, second
reason and purpose	13	nonetheless, only if, provided that
all causal connectives	49	although, nonetheless, only if
positive causal connectives	41	because, consequently, due, enable
opposition	18	but, however, on the contrary
determiners	7	a, an, the, this, that, these, those
demonstratives	4	this, that, these, those
attended demonstratives	4	This noun phrase is attended
unattended demonstratives	4	This is unattended
all additive connectives	61	as well, at least, besides, but
all logical connectives	122	actually, admittedly, after all, all in all
positive logical connectives	98	further, furthermore, hence, if
negative logical connectives	25	admittedly, alternatively, although
temporal connectives	53	a consequence of, after, again
positive intentional	23	by, desire, so, to that end
all positive connectives	115	instead, later, likewise
all negative connectives	27	despite the fact that, except that
all connectives	155	fortunately, again, up to now, while

Table 7.1 – TAACO's Connective Lists

In addition, TextInspector, EVP, and SkELL automatic tools enabled this study to determine the word level of each connective. In the essay dataset, for example, these tools aided to identify the corresponding word levels (e.g., A1 – C2) of connectives (e.g., 'and', and 'but') as suggested by the CEFR standards for L2 writing.

In particular, these results suggest that a group of eighteen connectives regarded as basic and low intermediate (e.g., A1/A2, and B1) comprised 82% of the total frequency of connectives in essays.

More relevant, these findings show that from a total of 243 unique connective items included in twenty-five variables (TAACO), 140 connective words were found in the essay dataset. They included thirty-one items at the A1 level, twenty-

six at the A2 level, thirty-nine at the B1 level, thirty-three at the B2, ten at the C1 level and only one connective at the C2 level of the CEFR word standards. Table 7.2 summarises the most frequent connectives found in essays by L2 writers. (See Appendix V for a list of all connectives linked to the CEFR standards for the essay dataset).

Connective	CFER Scale	Freq. 10K Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
and	A1	347	347	26	239	26.04
that	A1	147	494	37	222	11.01
for	A1	104	597	45	203	7.78
because	A1	73	670	50	178	5.47
as	A1	63	733	55	151	4.70
also	A1	52	785	59	141	3.92
or	A1	46	831	62	137	3.46
this	A1	43	874	66	128	3.21
but	A1	36	910	68	129	2.71
although	B1	26	936	70	97	1.97
when	B2	26	962	72	91	1.97
by	A2	22	985	74	86	1.68
even	B2	20	1005	75	84	1.53
so	A2	20	1026	77	76	1.53
make	B1	20	1046	79	81	1.50
for example	A1	20	1065	80	79	1.47
these	A1	17	1082	81	70	1.28
if	A2	16	1099	82	64	1.22

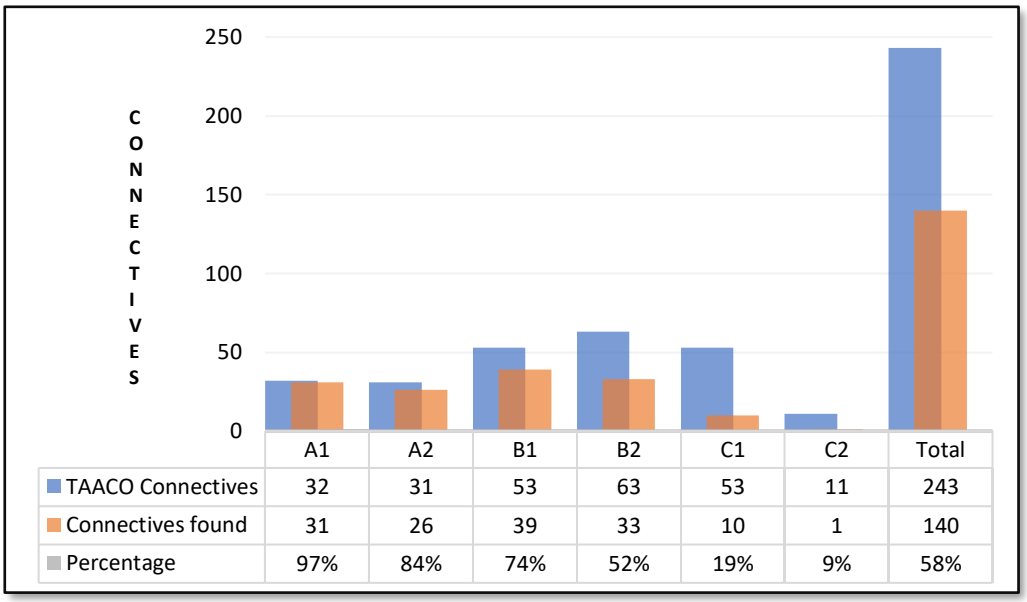
Table 7.2 – Descriptive Information of Connectives in Essays

In addition, a comparison analysis was conducted in the essay group to understand better the presence of TAACO connective words concerning the A1 – C2 CEFR word levels.

The findings suggest that a variety of TAACO connectives were used across each CEFR level. As mentioned earlier, a substantial portion of connectives at the A1 and A2 levels was found in the data. In addition, the results show a sporadic presence of instances of connectives regarded as intermediate (e.g., B1 and B2) and a marginal number of advanced connectives (e.g., C1 and C2) in essays.

These findings suggest that the additive conjunction ‘and’, the causal conjunction ‘because’, and the additive adverb ‘also’, are all regarded as first-level or beginner-level connectives (i.e., A1 Level, according to the CEFR word

classification standards), were found to be broadly used in essays by L2 writers, for example. These results seem to be consistent with other research, which suggests that L2 writers tend to include highly frequent connectives (e.g., Chanyoo, 2018; Lahuerta Martinez, 2016). The comparison analysis between the connectives found in the collected texts and connectives by TAACO is presented in Figure 7.3.



	A1	A2	B1	B2	C1	C2	Total
TAACO Connectives	32	31	53	63	53	11	243
Connectives found	31	26	39	33	10	1	140
Percentage	97%	84%	74%	52%	19%	9%	58%

Figure 7.3 – TAACO Connectives and the CEFR Levels in Essays

However, the possible interference of some items functioning beyond connectives cannot be ruled out. The scores to determine the presence of connective words in the collected texts provided by automatic analysers must be interpreted with caution because the findings indicate that some items were used to perform other grammatical functions.

The analysers seem to fall short of distinguishing the various grammatical functions of some words and phrases, which may act as connectives but also perform other functions such as (a) prepositions to refer to the role of a person or a thing (e.g., They work *as* teachers.); (b) adverbs used to make adjectives or adverbs stronger (e.g., Thank you *so* much.); (c) adverbs to ask questions (e.g., when); (e) or expressions aimed to add accuracy (e.g., that is), which may also be confounded with other grammatical combinations (e.g., That is not good).

As emphasised earlier, not only do these outcomes need to be taken with caution, as they are mere approximations of various connectives included in a single

variable, but also because the automatic identification seems to fall short of distinguishing the multifunction of words undertaken in essays.

7.1.2 Reliability Checks on Connective Measures in Essays

Reliability checks on average and frequency variables that measured the number of connective items in essays were conducted. Frequency measures were obtained by reversing the average calculation in each connective variable. That is, multiplying the average scores (obtained from TAACO) by the number of words in each text.

For example, the average score (0.039) on the conjunction index, which measures the occurrences of 'and' and 'but' in all essays, allowed us to obtain the frequency (8.13) of the conjunction index by multiplying the mean (212.3) number of words in the collected texts.

The calculation of the 'conjunction' index, which includes the connective items 'and' and 'but', is exemplified in Table 7.4.

Conjunction Index Constituents	Count	Average Calculation	Frequency Calculation
and but	1767 184	1951 / 240	0.0382 X 212.3
	Σ = 1951	= **0.0382**	= **8.129**

Table 7.4 – Average and Frequency Measures of the Conjunction Index

However, the frequency and average scores are a rough approximation of the actual number of both items ('and', 'but') comprising the 'conjunction' index.

Hence, it is essential to emphasise that the average and frequency scores represent approximations of different connective items included in variables to measure a variety of connective relationships.

Descriptive statistics showing twenty-five average and twenty-five frequency indexes and their standard deviation scores of connective measures in essays are presented in Table 7.5.

Connective Lists	Connectives Average		Connectives Frequency	
	Mean	Std. Deviation	Mean	Std. Deviation
determiners	0.093	0.027	19.846	7.079
all connectives	0.081	0.021	17.33	5.51
all positive connectives	0.077	0.019	16.29	5.26
all additive connectives	0.055	0.017	11.62	4.24
all logical connectives	0.045	0.017	9.58	4.18
basic connectives	0.045	0.015	9.55	3.61
addition	0.043	0.015	9.05	3.57
conjunctions	0.039	0.015	8.13	3.25
sentence linking	0.027	0.013	5.79	2.86
positive causal connectives	0.023	0.013	4.94	2.92
lexical subordinators	0.022	0.011	4.77	2.54
positive logical connectives	0.021	0.011	4.56	2.53
all demonstratives	0.021	0.012	4.500	2.853
all causal connectives	0.02	0.012	4.21	2.66
unattended demonstratives	0.017	0.011	3.587	2.463
reason and purpose	0.015	0.01	3.28	2.13
all negative connectives	0.013	0.009	2.89	2.08
negative logical connectives	0.009	0.007	1.85	1.56
all temporal connectives	0.008	0.007	1.67	1.53
opposition words	0.005	0.005	1.13	1.06
positive intentional	0.005	0.005	1.12	1.17
disjunctions	0.004	0.005	0.98	1.13
attended demonstratives	0.004	0.005	0.913	1.061
coordinating conjuncts	0.003	0.004	0.62	0.86
order	0.002	0.003	0.5	0.76

Table 7.5 – Descriptive Statistics of Connective Variables in Essays

Additionally, a series of Cronbach's alpha tests aided this study to determine the internal consistency of the subscale scores of 50 variables obtained by automatically measuring the average and frequency of connective words in essays (Dunn et al., 2014). An initial coefficient $\alpha = 0.871$ obtained from the analysis of the original 50 variables and subsequent removal of items (e.g., by checking Pearson correlations coefficients that were lower than 0.3) indicated that the data (i.e., 28 variables) had a highly reliable coefficient $\alpha = .894$.

In addition, multicollinearity issues were addressed by checking the VIF values on twenty-eight connective variables measuring connectives in essays. The collinearity checks indicated that twelve connective indexes had a VIF of less

than 5. The remaining variables were subjected to a PCA analysis. However, while checking the PCA anti-image correlation matrix, five extra variables showed correlation values of less than 0.5. In the end, only seven variables met the assumptions for further analysis of connective items in essays.

Moreover, the PCA findings in the essay dataset revealed a single component with an eigenvalue greater than one. This was corroborated by a visual inspection of the scree plot and the total variance table, indicating that one component should be retained. The eigenvalue for the single factor accounted for about 58.73% of the total variance. The PCA findings on connective items of essays are presented in Table 7.6, and the scree plot corresponding to those factors is shown in Figure 7.7.

Component 1	Eigenvalue	Variance Percentage	Cumulative Variance
Causal, positive logical and causal, sentence linking, all logical, lexical subordinators, and reason and purpose connectives.	4.112	58.73	58.73

Table 7.6 – Eigenvalues from the PCA of Connectives in Essays

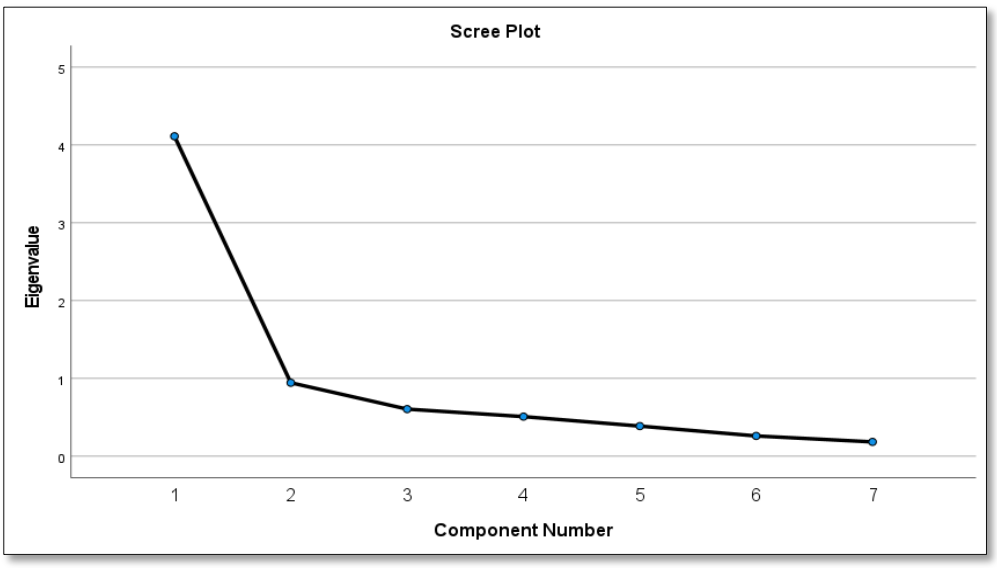


Figure 7.7 – PCA Eigenvalues Selected Variables in Essays

Additionally, the varimax rotation was consistent with the connective measures on essays. TAACO scores on connectives were related to strong loadings on specific types of connectives (e.g., all causal, positive logical, causal, sentence

linking, all logical, lexical subordinators, and reason and purpose connectives) found in component one. Those items are summarised in Table 7.8.

Components / Items	Rotated Component Coefficients
all causal	0.948
positive logical	0.941
positive causal	0.936
frequency of sentence linking	0.932
all logical	0.864
lexical subordinators	0.832
reason and purpose	0.749

Table 7.8 – Communalities and Component Loadings: Essays

7.1.3 The Relationship Between Connectives and Scores in Essays

A series of Pearson's correlational tests were conducted to determine whether the indexes measuring connectives in essays correlated with teachers' judgements of writing quality. The findings of those correlations are summarised in Table 7.9.

Connective Measures	*r*
Average of lexical subordinators	-.148*
Average of positive causal	-.147*
Average of positive logical	-.131*
Average of all causal connectives	-0.125
Average of all logical connectives	-0.087
Frequency of sentence linking connectives	0.069
Average of reason and purpose connectives	-0.021
*. Correlation is significant at the 0.05 level (2-tailed).	

Table 7.9 – Correlations of PCA Items and Grades in Essays

The findings showed that three correlations were weak and negative, with the variables significantly associated with lower grades. (See Table 7.9 above). (A list of all correlational findings in essays is presented in Appendix VI). Such correlational outcomes included:

- the average of lexical subordinators ($r(240) = -.148$, $p = .022$),

- the average of positive causal connectives (r(240) = -.147, p = .023), and
- the average of positive logical connectives (r(240) = -.131, p = .043).

These findings may indicate a negative relationship between three connective variables (and their constituents) and teachers' scores by L2 writers in Ecuador.

7.1.4 Exemplifying the Correlational Findings in Essays

In a closer look at connectives in essays, perhaps, one interesting finding is the weak and negative correlation between lexical subordinators and teachers' judgements of writing quality. Because lexical subordinators are used to connect clauses, phrases, and/or sentences, this index is linked to the identification of connectives at the sentence level (Crossley et al., 2016a).

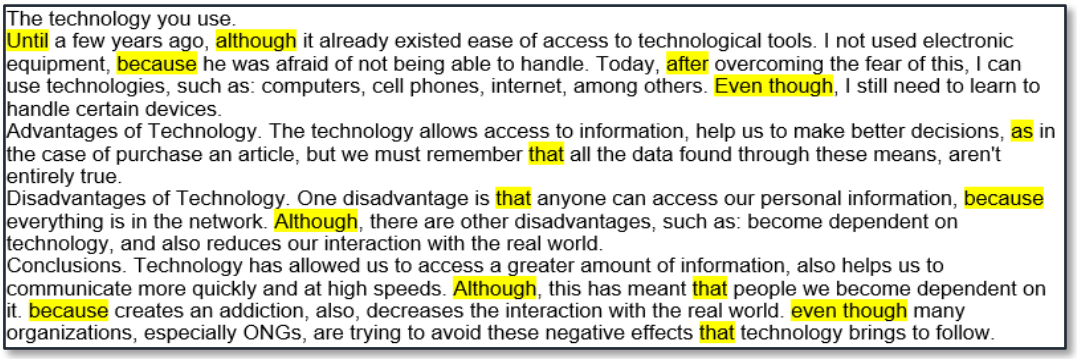

The technology you use.
Until a few years ago, although it already existed ease of access to technological tools. I not used electronic equipment, because he was afraid of not being able to handle. Today, after overcoming the fear of this, I can use technologies, such as: computers, cell phones, internet, among others. Even though, I still need to learn to handle certain devices.
Advantages of Technology. The technology allows access to information, help us to make better decisions, as in the case of purchase an article, but we must remember that all the data found through these means, aren't entirely true.
Disadvantages of Technology. One disadvantage is that anyone can access our personal information, because everything is in the network. Although, there are other disadvantages, such as: become dependent on technology, and also reduces our interaction with the real world.
Conclusions. Technology has allowed us to access a greater amount of information, also helps us to communicate more quickly and at high speeds. Although, this has meant that people we become dependent on it. because creates an addiction, also, decreases the interaction with the real world. even though many organizations, especially ONGs, are trying to avoid these negative effects that technology brings to follow.

Figure 7.10 – Lexical Subordinators in a Sample Essay

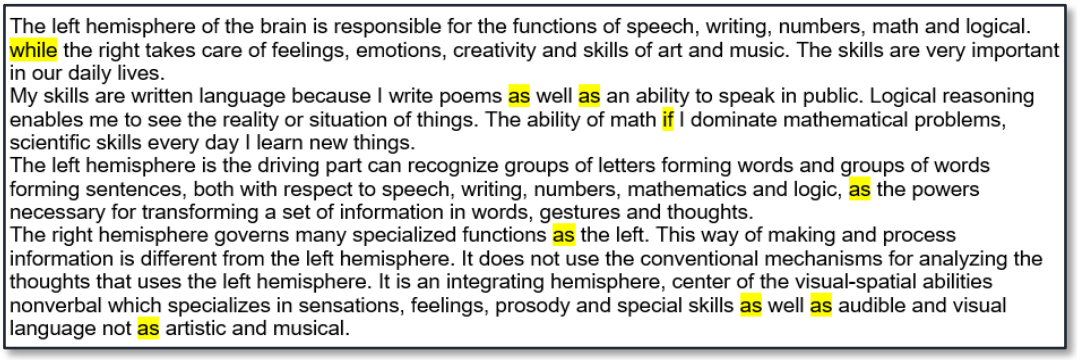

The left hemisphere of the brain is responsible for the functions of speech, writing, numbers, math and logical. while the right takes care of feelings, emotions, creativity and skills of art and music. The skills are very important in our daily lives.
My skills are written language because I write poems as well as an ability to speak in public. Logical reasoning enables me to see the reality or situation of things. The ability of math if I dominate mathematical problems, scientific skills every day I learn new things.
The left hemisphere is the driving part can recognize groups of letters forming words and groups of words forming sentences, both with respect to speech, writing, numbers, mathematics and logic, as the powers necessary for transforming a set of information in words, gestures and thoughts.
The right hemisphere governs many specialized functions as the left. This way of making and process information is different from the left hemisphere. It does not use the conventional mechanisms for analyzing the thoughts that uses the left hemisphere. It is an integrating hemisphere, center of the visual-spatial abilities nonverbal which specializes in sensations, feelings, prosody and special skills as well as audible and visual language not as artistic and musical.

Figure 7.11 – Lexical Subordinators in a Sample Essay

Very weak correlational results may suggest that the presence of lexical subordinators (e.g., although, as, because, before, if, though) lowered the scores of essays by L2 writers. This outcome is contrary to that of Crossley et al. (2016a), who found that the incidence of simple subordinators had a significant positive

correlation with combined scores (r=.11) in L2 writing. See Figures 7.10 and 7.11 above.

That discrepancy could be attributed to the constituents dominating the average lexical subordinators index. In other words, a small number of highly frequent connectives (e.g., that, because, as, although) seems to have played a key role in the resulting correlation between lexical subordinators and teachers' scores in essays. Descriptive statistics on the lexical subordinator variable and its constituents in the essay dataset are presented in Table 7.12.

Item	CEFR Scale	Freq. Per 10k Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
that	A1	147	147	41	222	40.71
because	A1	73	220	61	178	20.22
as	A1	63	282	78	151	17.38
although	B1	26	309	86	97	7.3
if	A2	16	325	90	64	4.52
though	B2	14	339	94	53	3.87
since	B1	7	346	96	29	1.96
before	A2	5	351	97	22	1.36
while	A2	3	354	98	16	0.87
until	B1	3	357	99	11	0.71
after	A2	2	358	99	7	0.44
wherever	B1	1	359	100	5	0.27
once	A2	1	360	100	3	0.22
till	B1	0	360	100	1	0.05
unless	B1	0	360	100	1	0.05
whenever	B1	0	361	100	1	0.05

Table 7.12 – Lexical Subordinators in Essays

An additional source of uncertainty is whether the automatic measuring accurately identified the distinct functions underlying lexical subordinator words and whether those tallies have played a role in the negative correlations with the teachers' scores in essays by L2 writers. In fact, these findings may be somewhat limited by the presence of other high-frequency words comprising the lexical subordinators index (e.g., that, as, since) (See Table 7.12 above).

The lexical item 'that', for example, that also performs other grammatical functions (e.g., determiner, a demonstrative pronoun, relative pronoun), may have been confounded as a conjunction aimed to introduce that-clauses in

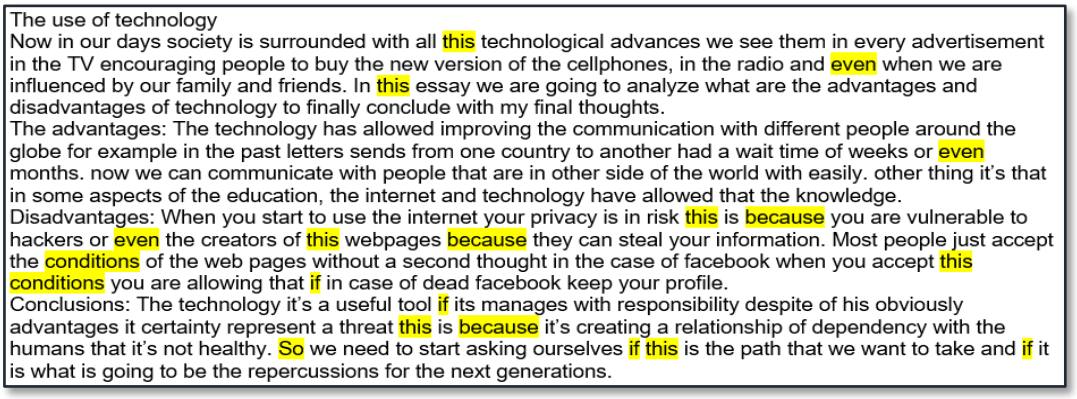
sentences in essays by L2 writers. Similarly, it is unclear whether the lexical item 'as' was identified as a preposition or conjunction. Additional uncertainty arises from 'since' and whether this item was identified as a conjunction to introduce a reason, a preposition, or an adverb to refer to a time.

Another finding in this study included a significant weak and negative correlation between the teachers' scores of essays and positive causal connectives (e.g., because, this, even, so). Table 7.13 shows the most common positive causal items found in essays by L2 writers.

Item	CEFR Scale	Freq. Per 10k Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
because	A1	73	73	29	178	28.72
this	A1	43	116	45	128	16.87
even	B2	20	136	53	84	8.05
so	A2	20	157	61	76	8.05
make	B1	20	177	68	81	7.89
if	A2	16	193	75	64	6.42
only	A1	9	202	78	37	3.64
makes	B1	8	210	82	36	3.25
since	B1	7	217	84	29	2.79
made	A1	4	222	86	19	1.63
cause	B2	4	225	87	16	1.55
making	A1	4	229	89	20	1.55
causes	B2	4	233	90	18	1.39

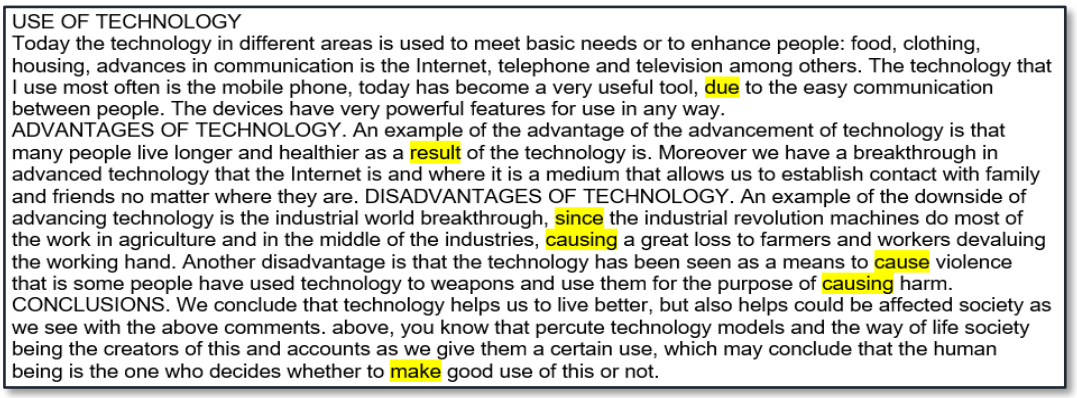
Table 7.13 – Positive Causal Connectives in Essays

However, Crossley et al. (2016a) showed that the incidence of positive causal connectives positively correlated with organisation scores in essays by L2 writers. This differs from the findings presented here. In this study, positive causal connectives seem to lower the teachers' scores of essays by L2 writers in Ecuador. Like in the previous results, it is difficult to explain this result. However, it might be related to the objectives leading the current study. On the one hand, the finding in this study may help to understand the use of causal connectives occurring at the sentence level and their contrasting association with the teachers' scores in essays by L2 writers in Ecuador (see samples 7.14 – 7.16).



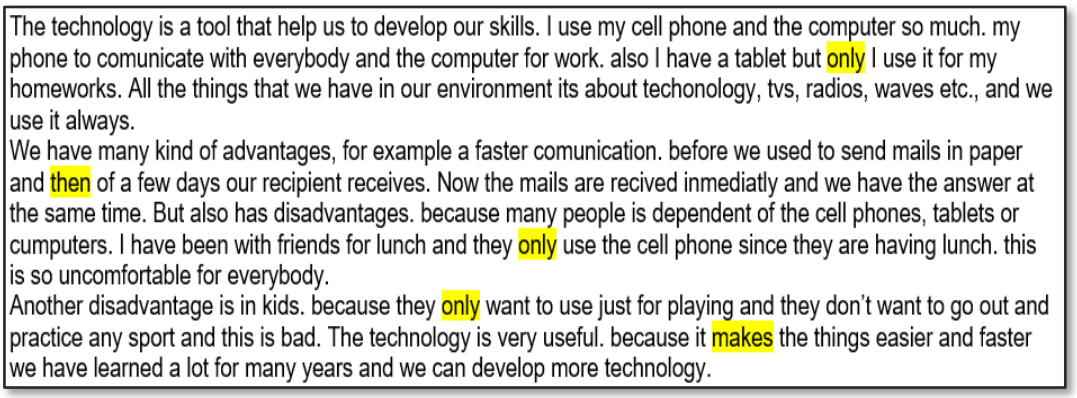
The use of technology
Now in our days society is surrounded with all this technological advances we see them in every advertisement in the TV encouraging people to buy the new version of the cellphones, in the radio and even when we are influenced by our family and friends. In this essay we are going to analyze what are the advantages and disadvantages of technology to finally conclude with my final thoughts.
The advantages: The technology has allowed improving the communication with different people around the globe for example in the past letters sends from one country to another had a wait time of weeks or even months. now we can communicate with people that are in other side of the world with easily. other thing it's that in some aspects of the education, the internet and technology have allowed that the knowledge.
Disadvantages: When you start to use the internet your privacy is in risk this is because you are vulnerable to hackers or even the creators of this webpages because they can steal your information. Most people just accept the conditions of the web pages without a second thought in the case of facebook when you accept this conditions you are allowing that if in case of dead facebook keep your profile.
Conclusions: The technology it's a useful tool if its manages with responsibility despite of his obviously advantages it certainty represent a threat this is because it's creating a relationship of dependency with the humans that it's not healthy. So we need to start asking ourselves if this is the path that we want to take and if it is what is going to be the repercussions for the next generations.

Figure 7.14 – Positive Causal Connectives in an Essay



USE OF TECHNOLOGY
Today the technology in different areas is used to meet basic needs or to enhance people: food, clothing, housing, advances in communication is the Internet, telephone and television among others. The technology that I use most often is the mobile phone, today has become a very useful tool, due to the easy communication between people. The devices have very powerful features for use in any way.
ADVANTAGES OF TECHNOLOGY. An example of the advantage of the advancement of technology is that many people live longer and healthier as a result of the technology is. Moreover we have a breakthrough in advanced technology that the Internet is and where it is a medium that allows us to establish contact with family and friends no matter where they are. DISADVANTAGES OF TECHNOLOGY. An example of the downside of advancing technology is the industrial world breakthrough, since the industrial revolution machines do most of the work in agriculture and in the middle of the industries, causing a great loss to farmers and workers devaluing the working hand. Another disadvantage is that the technology has been seen as a means to cause violence that is some people have used technology to weapons and use them for the purpose of causing harm.
CONCLUSIONS. We conclude that technology helps us to live better, but also helps could be affected society as we see with the above comments. above, you know that percute technology models and the way of life society being the creators of this and accounts as we give them a certain use, which may conclude that the human being is the one who decides whether to make good use of this or not.

Figure 7.15 – Positive Causal Connectives in an Essay



The technology is a tool that help us to develop our skills. I use my cell phone and the computer so much. my phone to comunicate with everybody and the computer for work. also I have a tablet but only I use it for my homeworks. All the things that we have in our environment its about techonology, tvs, radios, waves etc., and we use it always.
We have many kind of advantages, for example a faster comunication. before we used to send mails in paper and then of a few days our recipient receives. Now the mails are recived inmediatly and we have the answer at the same time. But also has disadvantages. because many people is dependent of the cell phones, tablets or cumputers. I have been with friends for lunch and they only use the cell phone since they are having lunch. this is so uncomfortable for everybody.
Another disadvantage is in kids. because they only want to use just for playing and they don't want to go out and practice any sport and this is bad. The technology is very useful. because it makes the things easier and faster we have learned a lot for many years and we can develop more technology.

Figure 7.16 – Positive Causal Connectives in an Essay

On the other hand, the positive correlation found by Crossley et al. (2016a) covered a double aim. Their study focused on determining the association of causal connectives combined with other criteria (e.g., content, organisation, vocabulary, language use, and mechanics) and the overall quality of essays. Moreover, their study aimed to investigate organisation rating, which presumes further assessment requirements to assess high writing proficiency (e.g.,

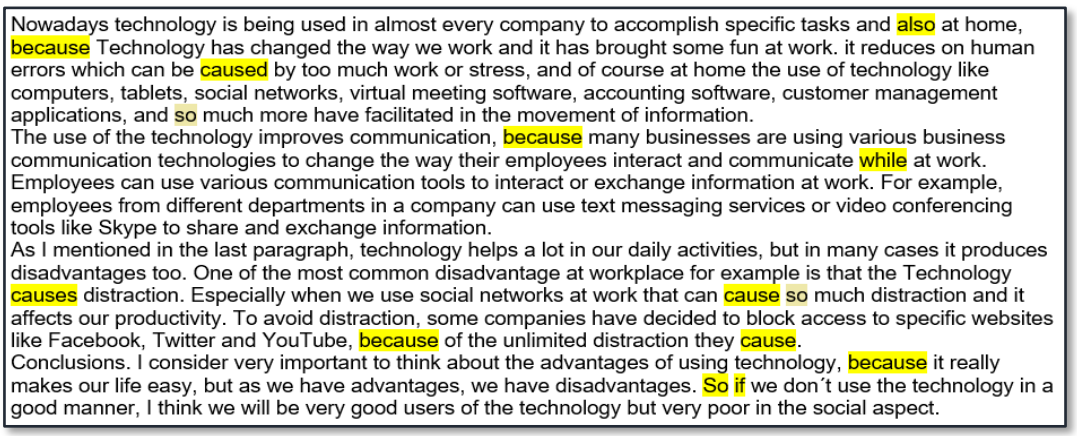
excellent overall organisation, excellent use of transition words, excellent connections between paragraphs). Interestingly, in the same study, Crossley et al. (2016a) found that the frequency of all causal connectives negatively correlated with organisation scores and combined scores of essays by L2 writers.

One final finding in this study is the weak and negative correlation between the teachers' scores and the average of the positive logical connectives index. This index that contains ninety-eight items (e.g., if, so, because, in conclusion) was found to lower the teachers' scores. The most frequent positive logical connectives found in the essay dataset are presented in Table 7.17.

Connective	CEFR Scale	Freq. Per 10k Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% Of each Connective
For	A1	104	104	31	203	31.0
Because	A1	73	177	53	178	21.8
Also	A1	52	229	69	141	15.6
So	A2	20	249	75	76	6.1
If	A2	16	266	80	64	4.9
in conclusion	B2	9	275	82	47	2.8
Since	B1	7	282	84	29	2.1
that is	C1	6	288	86	27	1.8
due to	B1	4	292	87	21	1.3
Cause	B2	4	296	89	16	1.2
Causes	B2	4	300	90	16	1.1

Table 7.17 – Positive Logical Connectives in Essays

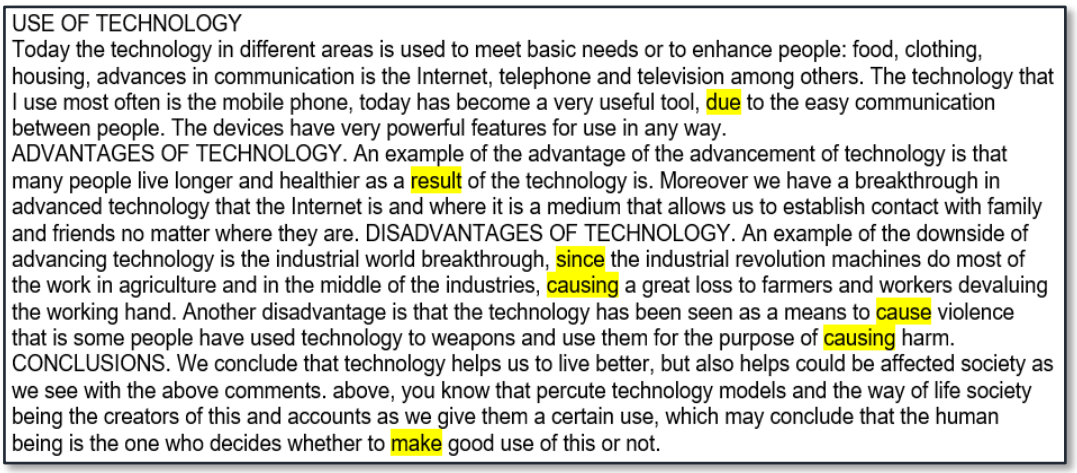
This finding may be consistent with that of Kim and Crossley (2018), who found a weak and negative correlation between positive logical connectives and raters' scores of independent essays by L2 test takers (e.g., TOEFL online-based examination). Similarly, positive logical connectives had a negative and weak correlation in the raters' scores of essays by high school writers (Crossley & McNamara, 2012b).



Nowadays technology is being used in almost every company to accomplish specific tasks and also at home, because Technology has changed the way we work and it has brought some fun at work. it reduces on human errors which can be caused by too much work or stress, and of course at home the use of technology like computers, tablets, social networks, virtual meeting software, accounting software, customer management applications, and so much more have facilitated in the movement of information.
The use of the technology improves communication, because many businesses are using various business communication technologies to change the way their employees interact and communicate while at work. Employees can use various communication tools to interact or exchange information at work. For example, employees from different departments in a company can use text messaging services or video conferencing tools like Skype to share and exchange information.
As I mentioned in the last paragraph, technology helps a lot in our daily activities, but in many cases it produces disadvantages too. One of the most common disadvantage at workplace for example is that the Technology causes distraction. Especially when we use social networks at work that can cause so much distraction and it affects our productivity. To avoid distraction, some companies have decided to block access to specific websites like Facebook, Twitter and YouTube, because of the unlimited distraction they cause.
Conclusions. I consider very important to think about the advantages of using technology, because it really makes our life easy, but as we have advantages, we have disadvantages. So if we don´t use the technology in a good manner, I think we will be very good users of the technology but very poor in the social aspect.

Figure 7.18 – Positive Logical Connectives in an Essay

These results may support the ideas of Crossley et al. (2011), who suggest that L1 novice writers (e.g., ninth-grade) are more likely to produce texts with a higher incidence of positive logical connectives. Sample texts in Figure 7.18 above and Figure 7.19 show examples of the most common positive logical connectives found in essays.



USE OF TECHNOLOGY
Today the technology in different areas is used to meet basic needs or to enhance people: food, clothing, housing, advances in communication is the Internet, telephone and television among others. The technology that I use most often is the mobile phone, today has become a very useful tool, due to the easy communication between people. The devices have very powerful features for use in any way.
ADVANTAGES OF TECHNOLOGY. An example of the advantage of the advancement of technology is that many people live longer and healthier as a result of the technology is. Moreover we have a breakthrough in advanced technology that the Internet is and where it is a medium that allows us to establish contact with family and friends no matter where they are. DISADVANTAGES OF TECHNOLOGY. An example of the downside of advancing technology is the industrial world breakthrough, since the industrial revolution machines do most of the work in agriculture and in the middle of the industries, causing a great loss to farmers and workers devaluing the working hand. Another disadvantage is that the technology has been seen as a means to cause violence that is some people have used technology to weapons and use them for the purpose of causing harm.
CONCLUSIONS. We conclude that technology helps us to live better, but also helps could be affected society as we see with the above comments. above, you know that percute technology models and the way of life society being the creators of this and accounts as we give them a certain use, which may conclude that the human being is the one who decides whether to make good use of this or not.

Figure 7.19 – Positive Logical Connectives in an Essay

The present study raises the possibility that positive logical connectives may have been one of the causes of lower raters' scores of essays by L2 writers and L1 novice writers.

However, as mentioned earlier, these results are based on exceptionally low correlations, therefore need to be interpreted with caution. Other factors beyond the inclusion of positive logical connectives may have also played a role in lowering teachers' judgement of writing quality by L2 writers in Ecuador.

Ultimately, the evidence presented in this section suggests that lexical subordinators, positive causal, and positive logical connectives occurring at the local level of the collected essays negatively correlated with the teachers' judgements of writing quality by L2 writers in Ecuador.

Consistent with the literature, this study found that cohesion items occurring at the sentence level may be related to lower judgements of L2 writing quality. However, these findings may be somewhat limited by the results of past studies indicating an inverse relationship. Some studies suggest that connectives (e.g., lexical subordinators and positive causal connectives) happening at the sentence level positively correlate with raters' scores in essays by L2 writers.

More relevant, these findings on connectives in essays may indicate that L2 writers included a variety of cohesive items regarded as necessary for the cohesion of writing at the B2 level. However, a note of caution is due here, since a small number of connectives regarded as low-level words (A1/A2 level according to the CEFR standards) seem to dominate their incidence in the collected texts. Those connectives (e.g., because, so, and if) were repeated in three indexes (e.g., lexical subordinators, positive causal, and positive logical connectives). Hence, the possible interference of these items cannot be ruled out.

7.1.5 Connective Predictors of Teachers' Scores in Essays

A stepwise regression analysis was conducted to determine which connectives were predictive of teachers' quality judgements. All variables (i.e., 7) that met the assumptions (e.g., coefficient alpha, VIF values) were included in the study for predicting the teachers' scores in essays by L2 writers. In that respect, the initial regression findings suggested that two extra assumptions were met. Residuals were independent, as assessed by a Durbin-Watson statistic of 1.746. Homoscedasticity was observed by visually inspecting the plot of standardised residuals versus standardised predicted values.

The regression results indicated that three connective variables (e.g., lexical subordinators, sentence linking, and positive causal connectives) were the best predictors of teachers' judgements of quality in the essay dataset.

These findings, which explained a mere 7.4% of the variance (R2 =0.74)., F (3, 236) = 6.308, p < .001, indicated that a group of specific connectives included in these variables had the greatest association with the grading of essays. (See additional information in Table 7.20).

Entry	Variable Added	R	r2	*B*	SE	*B*
1	Average of lexical subordinators	0.14	0.022	-29	10.88	-0.2
2	Frequency of sentence linking	0.22	0.051	0.148	0.04	0.25
3	Average of positive causal connectives	0.27	0.074	-23.1	9.55	-0.17
Notes: Estimated Constant Term is 6.308; B is unstandardised Beta; SE is standard error; B is standardised Beta.						

Table 7.20 – Stepwise Regression Findings of Connectives in Essays

Specifically, the predictors found in the analysis of essays indicated that the average of lexical subordinators (t = -2.67, p = .008), the frequency of sentence linking (t = 3.53, p = .001), and the average of positive causal connectives (t = -2.42, p = .016) were significant predictors in the model.

The most prominent finding to emerge from the regression analysis is that predictors positively and negatively predicted the teachers' judgements of writing quality in essays. While the frequency of sentence linking connectives (e.g., for, because, as, but, although) increased the teachers' scores, the averages of lexical subordinators and positive causal connectives seem to lower the teachers' scores.

The frequency of sentence linking connectives, for example, which comprised low and intermediate-level connective items (i.e., A1/A2 and B1/B2), predicted the increment of teachers' scores in essays. More importantly, this finding may help in answering the third research question, which sought to investigate whether specific connective words (e.g., but, although, however) matched the requirements on cohesion for the assessment of L2 writing. That is, this predictor suggests that sentence linking items (e.g., although, but) matched the CEFR requirements on cohesion in L2 writing.

Interestingly, the constituents comprising the *sentence linking* variable included mostly high-frequency items (e.g., A1 and A2) and less frequent connectives (e.g., B1 and B2) according to the CEFR word standards.

Item	CEFR Scale	Freq. 10k	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
for	A1	104	104	26	178	26.4
because	A1	73	177	45	178	18.5
as	A1	63	239	61	151	15.9
but	A1	36	276	70	129	9.2
although	B1	26	302	77	97	6.7
when	B2	26	328	83	91	6.7
so	A2	20	349	89	76	5.2
if	A2	16	365	93	64	4.1
since	B1	7	372	95	29	1.8
however	A2	6	378	96	26	1.5
while	A2	3	381	97	16	0.8
until	B1	3	383	98	11	0.7
therefore	B1	2	386	98	11	0.6
besides	B1	2	388	99	12	0.6
then	A1	2	390	99	7	0.4
after	B1	2	391	100	7	0.4

Table 7.21 – Sentence Linking Predictors of Teachers' Scores in Essays

A summary of the frequencies, percentages, and the number of texts found in the sentence linking connectives variable is presented in Table 7.21 above.

However, it is possible that this predictor may have been skewed by the predominant incidence of a few sentence-level items (e.g., for, because, as, but, although, when) occurring in essays.

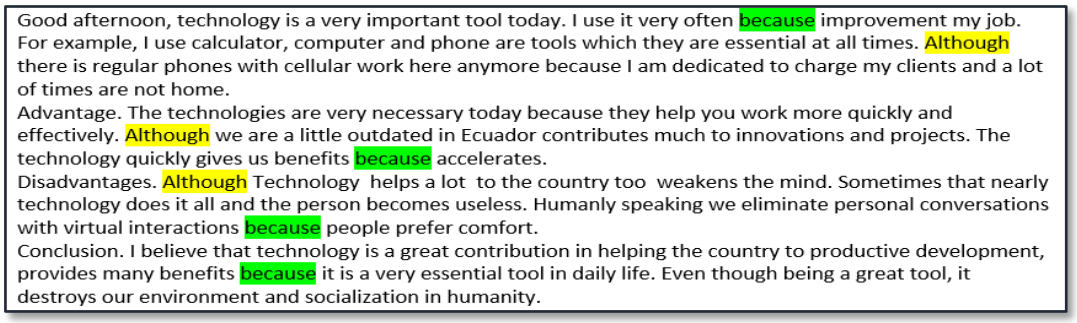

Good afternoon, technology is a very important tool today. I use it very often because improvement my job. For example, I use calculator, computer and phone are tools which they are essential at all times. Although there is regular phones with cellular work here anymore because I am dedicated to charge my clients and a lot of times are not home.
Advantage. The technologies are very necessary today because they help you work more quickly and effectively. Although we are a little outdated in Ecuador contributes much to innovations and projects. The technology quickly gives us benefits because accelerates.
Disadvantages. Although Technology helps a lot to the country too weakens the mind. Sometimes that nearly technology does it all and the person becomes useless. Humanly speaking we eliminate personal conversations with virtual interactions because people prefer comfort.
Conclusion. I believe that technology is a great contribution in helping the country to productive development, provides many benefits because it is a very essential tool in daily life. Even though being a great tool, it destroys our environment and socialization in humanity.

Figure 7.22 – Sentence Linking Items Present in an Essay

Usually we think that we can all do with practice in terms of study, but we need to think more about how do it correctly. since it's not just about do that, it is to think it correctly. since it is possible to improve the performance of the practice so that you can perform better.
In this situation it can be added that practice itself is only one part. there are several factors that help with learning. To improve the development of skills with practice. You can do several things such as being curious, trying to inform yourself or knowing something else before touching on the subject, among other things.
Practice influences how a person develops a skill. In this way, the importance is on improving our practice and what this entails.
In conclusion, knowing all this we need to improve more when practicing. many experts point out that the practice is not only what we must take into account to improve but it is one more piece.
I can say That practice is important but it is not the only thing. really that must be taken into account. even experts need practice. I think it is good to stay informed, feel curious, be cautious when carrying out an activity and especially when practicing.
Finally, just saying that it is better to see things in different ways. Not just focusing on one but exploring more. All of them makes us better in different ways.

Figure 7.23 – Sentence Linking Connectives

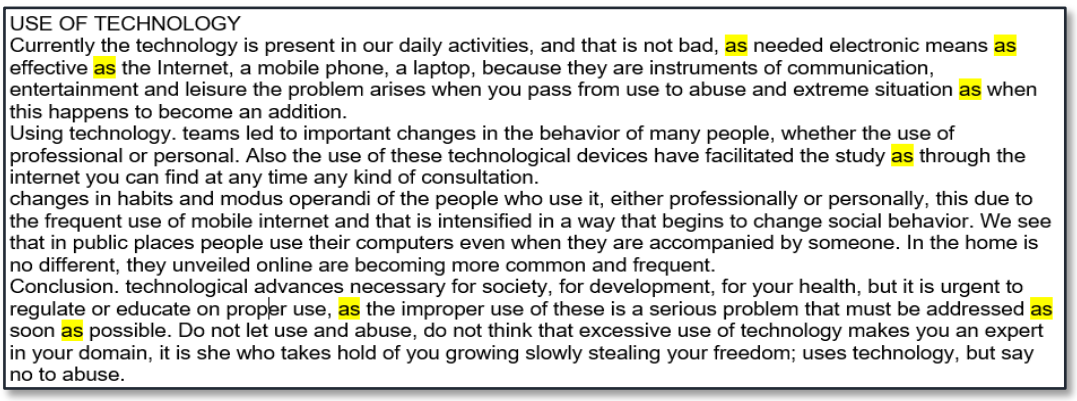
More relevant, the possible interference of extra specific connectives performing multiple functions cannot be ruled out. That is, while some sentence linking items (e.g., because, but, although) may perform a clear-cut function in the texts (e.g., to introduce subordinate clauses) (see sample texts 7.22 and 7.23 above), other textual items (e.g., for, so, as) seem to function mainly as prepositions (e.g., for), intensifiers (e.g., so), comparatives (e.g., as … as), and rarely as conjunctions in the collected texts. See sample texts in figures 7.24 – 7.26 showing these confounding items.

The technology that I usually use is the internet and the smatphone all the day. because in my work we need be on line all the day for consults and sales. I love to use the current technology because I am studying Computer Science.
Currently, the technology is used for almost activities everyday and it helps to do them. We have many advantages of Technology and there are people using it for all and they can't "live" without it. Personally I am considered one of them because I wake up and use it and all my family does the same, for example we have advantages such as, to use for investigation, for entertaiment, for comunication, for information, for knowing the clime and many things more we can do using the technology. The internet is a very clear example about that.
But we have many Disadvantages of Technology too, because if we aren't sure how to use or how to implement it we should not use it. One of many disadvantage is the internet when is used for fraud or do fails. The children need supervision for use the technology and the internet because it can be dangerous for them.
Conclusions: All the people can use the internet and the technology but we should using to do good things and think about to live in a better world and dont thinks to do bad or use the technology for hurt someone else or thing.

Figure 7.24 – 'For' as a Preposition

Everyone in the world is intelligent, each one in his own way. So there are different types of intelligences, and Professor Howard Gardner of Harvard University says there are eight of them: verbal, logical, musical, visual, kinesthetic, interpersonal, intrapersonal and naturalist.
MY OWN INTELLIGENCES. Thinking about it, I suppose that I have a verbal intelligences, because I love a lot to learn by listening, reading and speaking. I am logical too, because it's so easy for me to resolve mathematics problems, programing software and others assignments. Sometimes, I even teach others classmates how to solve logic problems and puzzles.
CONCLUSION. My intelligences have served me too much in all of my life, for example: the verbal intelligences has allowed me to have a quite well knowledge of many science and the logical intelligences allowed me so much to study informatics engineering University today.

Figure 7.25 – 'So' as an Intensifier



USE OF TECHNOLOGY
Currently the technology is present in our daily activities, and that is not bad, as needed electronic means as effective as the Internet, a mobile phone, a laptop, because they are instruments of communication, entertainment and leisure the problem arises when you pass from use to abuse and extreme situation as when this happens to become an addition.
Using technology. teams led to important changes in the behavior of many people, whether the use of professional or personal. Also the use of these technological devices have facilitated the study as through the internet you can find at any time any kind of consultation.
changes in habits and modus operandi of the people who use it, either professionally or personally, this due to the frequent use of mobile internet and that is intensified in a way that begins to change social behavior. We see that in public places people use their computers even when they are accompanied by someone. In the home is no different, they unveiled online are becoming more common and frequent.
Conclusion. technological advances necessary for society, for development, for your health, but it is urgent to regulate or educate on proper use, as the improper use of these is a serious problem that must be addressed as soon as possible. Do not let use and abuse, do not think that excessive use of technology makes you an expert in your domain, it is she who takes hold of you growing slowly stealing your freedom; uses technology, but say no to abuse.

Figure 7.26 – 'As' as a Preposition

This result on sentence-linking connectives which has not previously been described suggests that cohesive features occurring at the local level of a text seem to play a key role in L2 writing. A possible explanation for this might be that teachers may have deemed the inclusion of connectives at the local level of essays as relevant for allocating higher scores. However, it is unclear how other sentence-linking constituents that perform multifunction roles may have influenced the teachers' scores in essays by L2 writers.

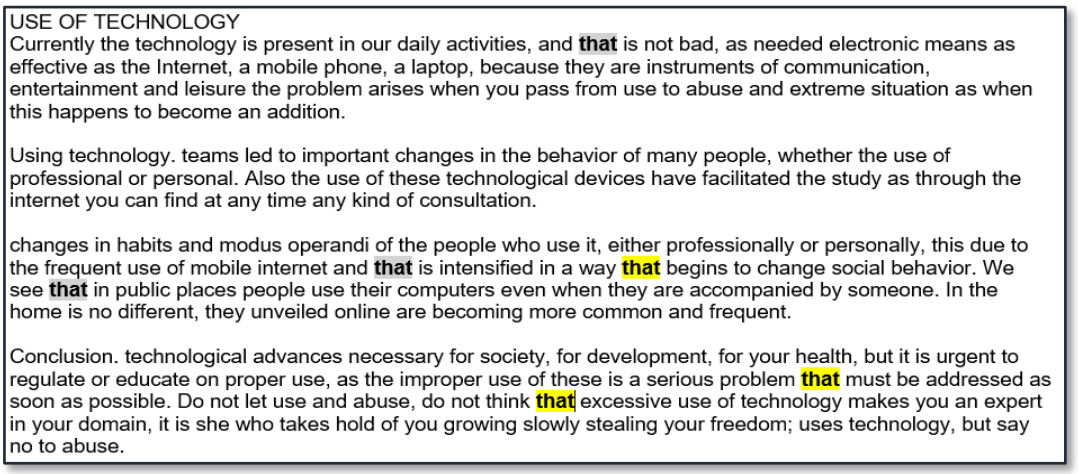
Another important finding was that the lexical subordinators index predicted the teachers' scores. This finding suggests that L2 writers used specific connectives comprising this index, which may have played a role in lowering teachers' scores of essays. Like in the previous findings on connectives, these data must be interpreted cautiously because highly frequent connectives seem to have influenced the results. Such high-frequency items included A1 level connectives (e.g., that, because, as), A2 connectives (e.g., if, before, while), B1 connectives (e.g., although, since, wherever), and a handful of B2 connectives (e.g., though) as suggested by the CEFR standards.

In particular, the predictor on lexical subordinators proposes that L2 writers use a small number of connectives (e.g., that, because, as, although and if), which comprised 90% of all connectives identified in essays. However, these connectives seem to negatively predict the teachers' scores in essays by L2 writers. Those very frequent lexical subordinators present in essays are summarised in Table 7.27.

Connective	CEFR Scale	Freq. Per 10k Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
that	A1	147	147	41	222	40.7
because	A1	73	220	61	178	20.2
as	A1	63	282	78	151	17.4
although	B1	26	309	86	97	7.3
if	A2	16	325	90	64	4.5

Table 7.27 – Most Frequent Lexical Subordinators in Essays

However, it is unclear whether the automatic analysers were able to characterise the multifunction (e.g., connective, preposition, adverb) of each identified item in essays. Some connectives may have confounded the scores provided by the automatic analysers as in the case of the connective 'that', other functions underlying this item should have confounded the analysis.



USE OF TECHNOLOGY
Currently the technology is present in our daily activities, and **that** is not bad, as needed electronic means as effective as the Internet, a mobile phone, a laptop, because they are instruments of communication, entertainment and leisure the problem arises when you pass from use to abuse and extreme situation as when this happens to become an addition.

Using technology. teams led to important changes in the behavior of many people, whether the use of professional or personal. Also the use of these technological devices have facilitated the study as through the internet you can find at any time any kind of consultation.

changes in habits and modus operandi of the people who use it, either professionally or personally, this due to the frequent use of mobile internet and **that** is intensified in a way **that** begins to change social behavior. We see **that** in public places people use their computers even when they are accompanied by someone. In the home is no different, they unveiled online are becoming more common and frequent.

Conclusion. technological advances necessary for society, for development, for your health, but it is urgent to regulate or educate on proper use, as the improper use of these is a serious problem **that** must be addressed as soon as possible. Do not let use and abuse, do not think **that** excessive use of technology makes you an expert in your domain, it is she who takes hold of you growing slowly stealing your freedom; uses technology, but say no to abuse.

Figure 7.28 – 'That' as a Conjunction and Demonstrative Pronoun

The sample essay presented in Figure 7.28 above exemplifies the occurrence of the lexical subordinator 'that' as a conjunction (highlighted in yellow) and demonstrative pronoun (in grey).

On one side, this finding may be consistent with that of Crossley et al. (2016a), who found that local cohesion features (e.g., connectives) occurring at the sentence level had a negative relationship or did not predict expert judgements of text coherence in L1 writing. On the other, this outcome is contrary to that of Crossley et al. (2016b), who found that the incidence of simple or single-word

subordinators (e.g., ‘that’) had a significant positive correlation with combined scores in essays by L2 writers.

A possible explanation for these contradictory results may be related to different teaching and assessment expectations by L2 teachers and expert raters of L1 writing. Even though, the findings indicate that L2 writers included a variety of connective words, a closer look at the use of connectives in essays indicates that L2 writers used the word ‘that’ as a conjunction as well as a demonstrative pronoun (See Essay sample 7.28 above).

In assessing those writings, L2 teachers may have considered the inclusion of ‘that’, indicating that L2 writers may have learned those connectives during the course. However, the correct use of ‘that’ as a demonstrative pronoun and ‘that’ as lexical subordinators may have also been considered not only by L2 teachers but also by expert raters of coherence of L1. In this study, that element seemed to have played a role in lowering the scores in essays by L2 writers, though.

The use of technology
The technology we use is cell phone helps me stay connected to my family and friends anytime, anywhere in the world computer for homework, homework internet to send, view videos. For these activities, such technology is very good because it saves time and allows us to stay connected with family and friends, but otherwise use it sparingly but can lose valuable time to spend with our loved ones, because of the time we can remove.
Advantage. The advantages of the technology at work are manifold; improvement efforts in the work, due to the high speed and efficiency this provides when executing any action; technology provides speed when performing any work, so when all production is done more quickly, but in this case technology can replace labor, for a machine with technology that saves time and increases production.
Disadvantages. Although the technology has its advantages, also it has its drawbacks; at work it reduces sources of employment as the technology saves more money and the machines do at a lower cost and time; also when the family is given misuse, cause much damage because its members prefer to be using these technological devices rather than paying attention to their loved ones, reducing the amount and quality of time.
Conclusion. Currently the use of technology is essential in all areas, although it has its advantages and disadvantages, although makes our life easier, we also can harm in the family because they can be custom always be with her, and not give time to the family, forgetting that this is also very important.

Figure 7.29 – ‘But’ and ‘Although’

More relevant, this finding on lexical subordinators may provide clues to answering the third research question regarding whether specific connectives (e.g., although, but) matched the cohesion requirements to assess writing at the B2 level as suggested by the CEFR standard (See Figure 7.29 above). Together, these findings must be interpreted with caution because the findings reported in this study derive from weak evidence, that is, from weak correlations and low R-squared values found in this study. As noted earlier, correlation does not imply

causation, and other factors beyond cohesion may have influenced the outcomes.

The use of technology
Now in our days society is surrounded with all this technological advances we see them in every advertisement in the TV encouraging people to buy the new version of the cellphones, in the radio and even when we are influenced by our family and friends. In this essay we are going to analyze what are the advantages and disadvantages of technology to finally conclude with my final thoughts.
The advantages: The technology has allowed improving the communication with different people around the globe for example in the past letters sends from one country to another had a wait time of weeks or even months. now we can communicate with people that are in other side of the world with easily. other thing it's that in some aspects of the education, the internet and technology have allowed that the knowledge.
Disadvantages: When you start to use the internet your privacy is in risk this is because you are vulnerable to hackers or even the creators of this webpages because they can steal your information. Most people just accept the conditions of the web pages without a second thought in the case of facebook when you accept this conditions you are allowing that if in case of dead facebook keep your profile.
Conclusions: The technology it's a useful tool if its manages with responsibility despite of his obviously advantages it certainty represent a threat this is because it's creating a relationship of dependency with the humans that it's not healthy. So we need to start asking ourselves if this is the path that we want to take and if it is what is going to be the repercussions for the next generations.

Figure 7.30 – Positive Causal Connectives

One last important finding was that the average of *positive causal* connectives negatively predicted the teachers' judgements of writing quality (See Figure 7.30 above exemplifying this predictor). A cluster of connective items (i.e., forty-one items) and labelled as positive causal (e.g., because, this, even, so) seems to have lowered the teachers' scores in essays by L2 writers in Ecuador.

Connective	CEFR Scale	Freq. Per 10k Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
because	A1	73	73	29	178	28.7
this	A1	43	116	45	128	16.9
even	B2	20	136	53	84	8.1
so	A2	20	157	61	76	8.1
make	B1	20	177	68	81	7.9
if	A2	16	193	75	64	6.4

Table 7.31 – Most Frequent Positive Causal Connectives in Essays

A closer look at this predictor indicates that not all connectives comprising the positive causal index were present in the essays by L2 writers. The results indicate that thirty-one positive causal connectives negatively may have influenced the teachers' scores. In addition, the descriptive summary of this variable suggests that a third of those connectives (e.g., 13) comprised 90% of the cumulative frequency. Of those, five connectives (e.g., because, this, even,

so, make, and if) comprised 75% of the total number of positive causal connectives found in essays. This last group of connectives was found in most texts, as shown in Table 7.31 above.

This finding may be contrasted with a previous study suggesting that positive causal connectives occurring at the sentence level had a positive relationship with raters' scores (e.g., organisation score and combined score) in essays by L2 writers (Crossley et al., 2016a).

However, the findings in this study on causal cohesion features are consistent with data obtained in the same study by Crossley et al. (2016a), who found that variables that measure causal links such as causal verbs (e.g., make, aid) and causal particles (e.g., thus, therefore) as well as the incidence of causal connectives in the entire text negatively correlated with raters' scores. Those outcomes may also be in agreement with those obtained by Crossley and McNamara (2009), who found that L2 writers used less causal cohesion than L1 writers. Similarly, Green (2012) found a significant difference between the amount of causal content in texts written by L2 and L1 writers.

Once again, a note of caution is due here because the dominance of very few high-frequency lexical items that perform other functions in texts in this study cannot be ignored. These results may have been confounded by the presence of other high-frequency connective words that function as positive causal connectives but also perform other grammatical functions. The causative item 'this', for example, shows that the connective 'this' functions anaphorically (e.g., this is because) and performs a deictic function (e.g., this essay).

7.2 Connective Words in Emails

Following a similar approach, automatic analysers (e.g., NVivo, Text Inspector, SkELL, EVP) were employed to verify connectives in emails. The findings from the email dataset indicate that L2 writers used highly frequent, basic connectives (i.e., A1 and A2 levels) according to the CEFR word standards. Interestingly, a small number of items (20) included almost 90% of all connectives found in emails. A list of the most frequent connectives is presented in Table 7.32. (See Appendix VII for a full list).

Connective	CEFR Scale	Freq. Per 10k Words	Cumulative Relative %	Number of Texts	% of Each Connective
the	A1	418	22	239	21.6
and	A1	269	35	235	13.9
a	A1	206	46	230	10.7
that	A1	158	54	207	8.1
for	A1	123	61	206	6.4
this	A1	83	65	163	4.3
because	A1	83	69	181	4.3
but	A1	69	73	150	3.6
if	A2	63	76	144	3.3
so	A2	45	78	105	2.3
want	A1	40	80	109	2.1
or	A1	38	82	97	2.0
when	B2	26	84	83	1.4
also	A1	24	85	74	1.2
as	A1	21	86	59	1.1
soon	A1	20	87	72	1.0
by	A2	16	88	56	0.9
first	A1	15	89	61	0.8
an	A1	15	89	57	0.8
next	A1	12	90	44	0.6

Table 7.32 – Descriptive Statistics of Connectives in Emails

In addition, the connectives found in emails were sub-classified according to the lists of connective items provided by TACCO and word levels as suggested by the CEFR standards. See Figure 7.33.

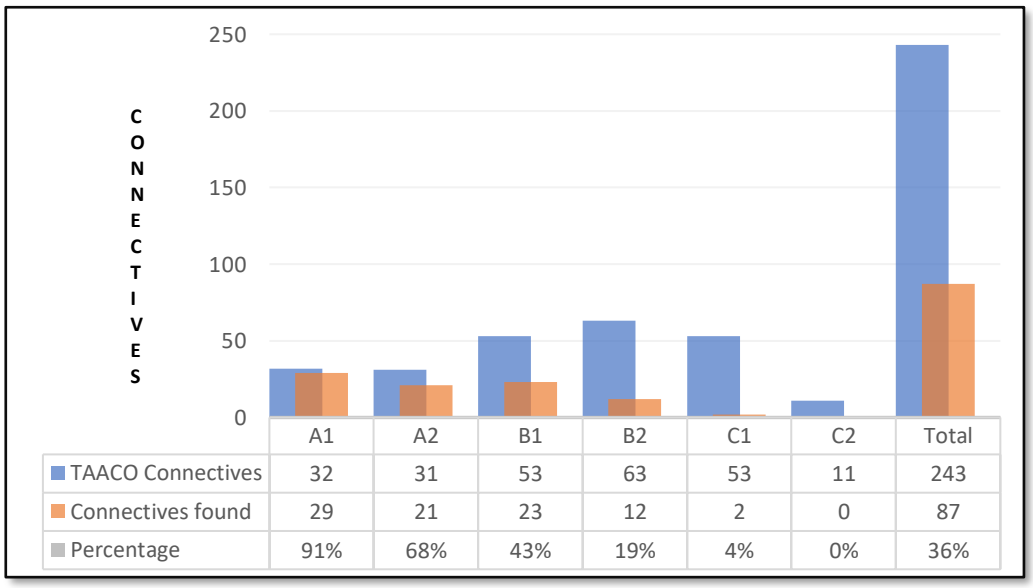


Figure 7.33 – TAACO Connectives and the CEFR Levels in Emails

Overall, the findings show that L2 writers preferred basic connectives (i.e., A1 and A2) to clarify propositions in their emails (see Figure 7.33 above).

Additionally, while some connectives labelled as B1 and B2 (i.e., intermediate) were found in the dataset, connectives regarded as high-level items (e.g., C1 – C2) were scarce and the least preferred by L2 writers. A possible explanation for this might be emails are, in general, less formal. As the findings suggest, L2 writers used highly frequent connectives (e.g., and, also, but).

7.2.1 The Relationship Between Connectives and Graded Emails

Two types of measures (i.e., averages and frequencies) were used to investigate the relationship between connectives and the teachers' scores in emails. Such descriptive statistics of those measures are presented in Table 7.34.

Connectives	Connectives Average		Connectives Frequency	
	Mean	S.D.	Mean	S.D.
determiners	0.088	0.026	15.6	5.8
all positive	0.07	0.019	12.2	4.2
all connectives	0.068	0.019	12.0	4.3
all additive	0.048	0.016	8.4	3.4
all logical	0.048	0.018	8.4	3.5
basic connectives	0.042	0.016	7.4	3.4
conjunctions	0.034	0.015	5.9	2.9
addition	0.032	0.015	5.6	3.0
sentence linking	0.03	0.014	5.3	2.6
lexical subordinators	0.026	0.012	4.5	2.7
positive causal	0.026	0.014	4.5	2.3
all demonstratives	0.025	0.014	4.4	2.6
positive logical	0.024	0.013	4.2	2.5
unattended demonstratives	0.017	0.012	3.0	2.2
all causal	0.014	0.01	2.5	1.9
all temporal	0.012	0.009	2.1	1.6
reason and purpose	0.012	0.009	2.1	1.6
all negative	0.012	0.01	2.1	1.8
opposition	0.009	0.008	1.6	1.4
attended demonstratives	0.008	0.008	1.5	1.4
negative logical	0.008	0.008	1.4	1.3
positive intentional	0.007	0.007	1.3	1.3
order	0.006	0.007	1.0	1.1
coordinating conjuncts	0.005	0.007	0.9	1.2
disjunctions	0.004	0.005	0.7	1.0

Table 7.34 – Averages and Frequencies of Connective Variables in Emails

To meet the basic statistical assumptions underlying the data, Cronbach's alpha tests were conducted on average and frequency scores. Such scores were obtained from the TAACO analysis of connectives in emails. The initial coefficient $\alpha = 0.894$ obtained from the analysis of the original 50 variables and subsequent removal of items (e.g., Pearson correlations coefficients < 0.3) indicated that the data (i.e., 30 variables) had a highly reliable coefficient $\alpha = 0.870$.

Multicollinearity issues were addressed by checking the VIF values on thirty connective indexes in emails. The collinearity checks indicated that ten connective indexes had a VIF of less than 5. These remaining variables were subjected to a PCA analysis. However, while checking the PCA anti-image correlation matrix, one extra variable showed a correlation value lower than 0.5. In the end, nine variables met the requirements for further PCA analysis on email connectives. The PCA analysis showed an acceptable KMO measure (0.780), suggesting that sampling was adequate for conducting a principal component analysis on the email dataset. Similarly, small values (e.g., $p < .001$) on Bartlett's Test of Sphericity indicated that a PCA might be useful in the analysis of emails.

The PCA findings in the email dataset revealed that two components had eigenvalues greater than one. This was corroborated by a visual inspection of the scree plot and the total variance table, indicating that two components should be retained.

The eigenvalues for the factors accounted for about 42.36% and 21.99% of the total variance. These findings are presented in Table 7.35, and the scree plot corresponding to these factors is shown in Figure 7.36.

Components 1 -2	Eigenvalues	Variance Percentage	Cumulative Variance
Positive logical, reason and purpose, all causal, lexical subordinators, positive causal	3.81	42.36	42.36
Opposition (frequency), all negative, sentence linking, addition	1.97	21.99	64.36

Table 7.35 – Eigenvalues from the PCA in Emails

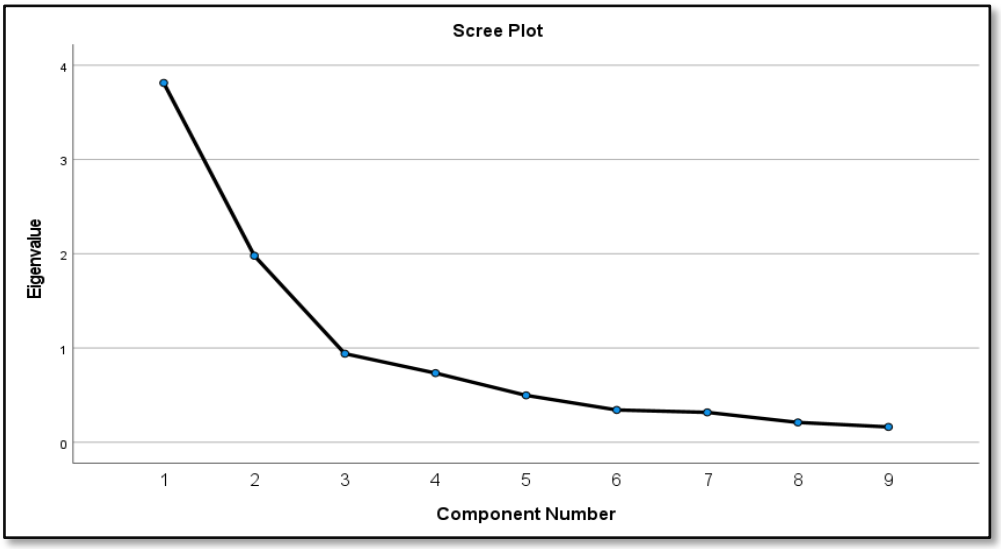


Figure 7.36 – PCA Eigenvalues in Emails

The two-component solution met the interpretability criterion, explaining 64.36% of the total variance. The varimax rotation was consistent with the connective measures in emails. That is TAACO scores that measured connective types were related to strong loading items found in Components 1 and 2. The final factor pattern for the two-factor solution included nine indexes (from the original 50) that were helpful in the identification of connective variables in emails. Table 7.37 shows the components found in the PCA analysis.

Components / Items	Rotated Component Coefficients	
	Comp. 1	Comp. 2
positive logical	0.849	
reason and purpose (frequency)	0.819	
all causal	0.789	
lexical subordinators	0.773	
positive causal	0.678	
opposition (frequency)		0.918
all negative		0.914
sentence linking		0.669
addition		0.491

Table 7.37 – Communalities and Component Loadings: Emails

Once the Cronbach's Alpha, the VIF values, and the PCA analyses helped to sift through significant variables in emails, a series of Pearson correlations were conducted with the items found in the PCA components. The findings of those

correlations are summarised in Table 7.38. (See Appendix VIII for all correlational outcomes).

Connectives (Frequencies and Means)	*r*
opposition (frequency)	-.139*
all causal connectives	.133*
reason and purpose (frequency)	0.12
positive logical	0.106
positive causal	0.084
addition	0.078
lexical subordinators	0.07
all negative	-0.043
sentence linking	-0.028
*. Correlation is significant at the 0.05 level (2-tailed).	

Table 7.38 – Correlations of Connectives and Grades in Emails

Specifically, the findings showed that two correlations were significantly associated with teachers' judgements of the writing quality of emails by L2 writers (See Table 7.38). While the frequency of opposition connectives ($r(240) = -.1139$, $p = .031$) may be associated with lowering grades, the average of all causal connectives ($r(240) = .133$, $p = .039$) may suggest that this variable increased the teachers' scores of emails by L2 writers.

7.2.2 Describing Correlational Findings in Emails

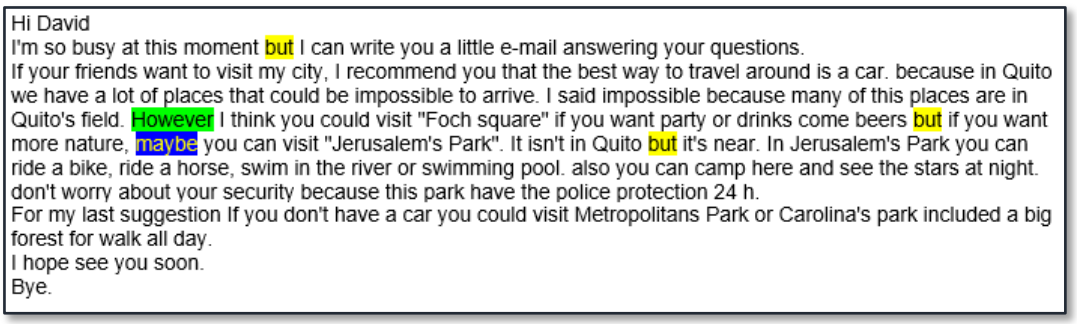
Relevant to this study is that the finding on opposition connectives (e.g., but, although, however) matched the CEFR requirements on cohesion in writing at the B2 level. Specifically, the incidence of 'but' comprised 78% of all items found occurring in 150 emails. This finding may corroborate that L2 heavily rely on this type of opposition connective.

Additionally, these highly frequent connectives labelled as A1 and A2 (according to the CEFR standards) were widely used by L2 writers. However, these findings suggest that teachers may have considered these connectors irrelevant in the scoring of emails. Less frequent opposition connectives (e.g., on the other hand, in spite of) are also included in the index. Their presence is marginal, though.

In a similar study, Kuzborska and Soden (2018) found no significant correlation between opposition expressions and writing scores in essays by L2 graduate

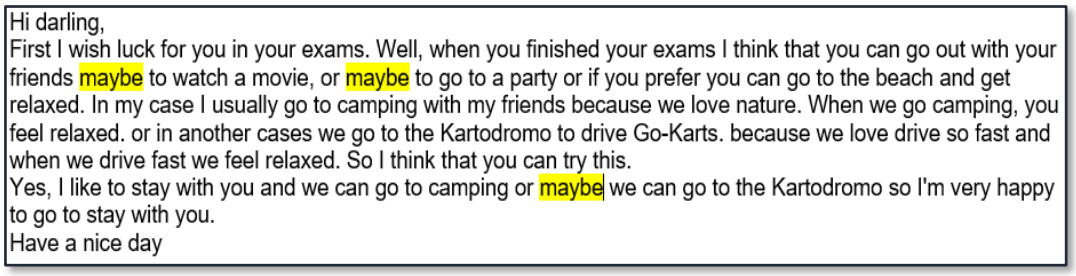
writers of L1 Chinese background. Their study that sought to quantify the differences in the frequency of opposition markers in L2 scored writing collected in two different phases (e.g., first and second-term writing) was accompanied by an in-depth analysis aimed to disentangle the nuances occurring in the use of opposition relations (e.g., contrast, concessive, corrective) found in essays by L2 writers (e.g., Izutsu, 2008).

Relevant to this study, those outcomes suggest that one-size-fits-all measures on connectives may fall short in identifying differences in connective items, let alone the disambiguation underlying the function of opposition connectives found in the analysis of sample emails (e.g., but, maybe, however) (Van Dijk, 1978). See sample emails in Figures 7.39 and 7.40.



Hi David
I'm so busy at this moment but I can write you a little e-mail answering your questions.
If your friends want to visit my city, I recommend you that the best way to travel around is a car. because in Quito we have a lot of places that could be impossible to arrive. I said impossible because many of this places are in Quito's field. However I think you could visit "Foch square" if you want party or drinks come beers but if you want more nature, maybe you can visit "Jerusalem's Park". It isn't in Quito but it's near. In Jerusalem's Park you can ride a bike, ride a horse, swim in the river or swimming pool. also you can camp here and see the stars at night. don't worry about your security because this park have the police protection 24 h.
For my last suggestion If you don't have a car you could visit Metropolitans Park or Carolina's park included a big forest for walk all day.
I hope see you soon.
Bye.

Figure 7.39 – Opposition Connectives



Hi darling,
First I wish luck for you in your exams. Well, when you finished your exams I think that you can go out with your friends maybe to watch a movie, or maybe to go to a party or if you prefer you can go to the beach and get relaxed. In my case I usually go to camping with my friends because we love nature. When we go camping, you feel relaxed. or in another cases we go to the Kartodromo to drive Go-Karts. because we love drive so fast and when we drive fast we feel relaxed. So I think that you can try this.
Yes, I like to stay with you and we can go to camping or maybe we can go to the Kartodromo so I'm very happy to go to stay with you.
Have a nice day

Figure 7.40 – Opposition Connectives

For example, Van Dijk (1978) noticed that the combination of repeated conditionals and connectives in the same sentence might lead to disambiguation issues, as the combination of various opposition items (however, but, maybe) seems to suggest in the samples of emails above. Nevertheless, the correlation findings indicate that a small group of opposition connectives, and more specifically, the presence of the connective ‘but’ may have negatively influenced

(i.e., decreased) the teachers' judgements of writing quality in emails by L2 writers.

Another interesting finding was that a group of connectives labelled as 'all causal connectives' (average) positively but weakly correlated the teachers' scores in emails. This outcome is contrary to that of Crossley et al. (2016a), who found that the frequency of all causal connectives positively correlated with text organisation scores of essays by L2 writers.

In this study, a closer look at the items comprising this index indicates that a highly frequent (A1) connector ('because') dominated the frequency (56%) and occurrence (e.g., 181 texts) in emails. As expected, L2 writers seem to prefer this connective over 'as' or 'since' to provide reasons. See examples of 'because' in the following Figure 7.41.

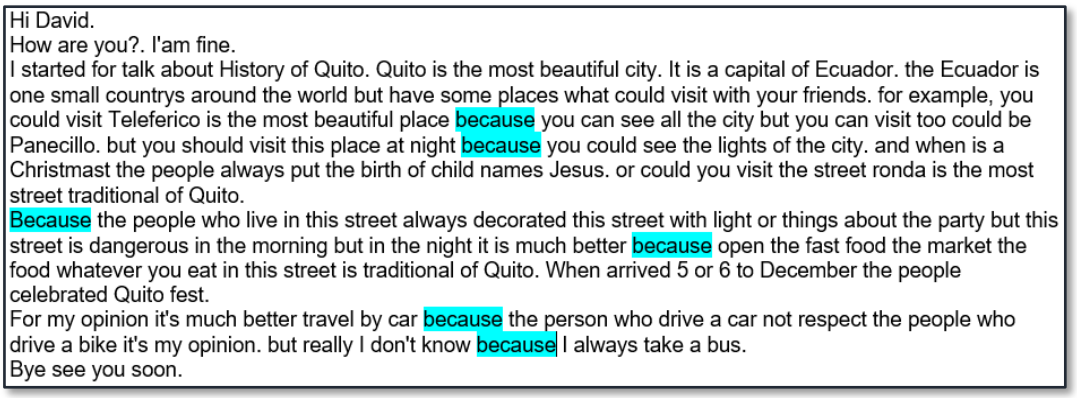

Hi David.
How are you?. I'am fine.
I started for talk about History of Quito. Quito is the most beautiful city. It is a capital of Ecuador. the Ecuador is one small countrys around the world but have some places what could visit with your friends. for example, you could visit Teleferico is the most beautiful place because you can see all the city but you can visit too could be Panecillo. but you should visit this place at night because you could see the lights of the city. and when is a Christmast the people always put the birth of child names Jesus. or could you visit the street ronda is the most street traditional of Quito.
Because the people who live in this street always decorated this street with light or things about the party but this street is dangerous in the morning but in the night it is much better because open the fast food the market the food whatever you eat in this street is traditional of Quito. When arrived 5 or 6 to December the people celebrated Quito fest.
For my opinion it's much better travel by car because the person who drive a car not respect the people who drive a bike it's my opinion. but really I don't know because I always take a bus.
Bye see you soon.

Figure 7.41 – The Use of Because in an Email

However, these results may have been confounded by the occurrence of other connectives (e.g., as, since, so) that function as causal connectives as well as prepositions and adverbs to refer to a time and conjunction to give reasons.

These confounding items may have played a role in identifying and quantifying all causal connectives in emails. For example, the presence of 'so', a highly frequent connective included in the 'all causal' connective index, may have been confounded by the conjunction 'so', which functions to introduce clauses of result or decision. Specifically, it is unclear the degree of influence of this connective in the correlational findings. The connective 'so' that performs other functions (e.g., degree adverb, substitute form, exclamation) seems to have influenced the

relationship between causal connectives and the teachers' judgements of the writing quality of emails (see Figure 7.42).

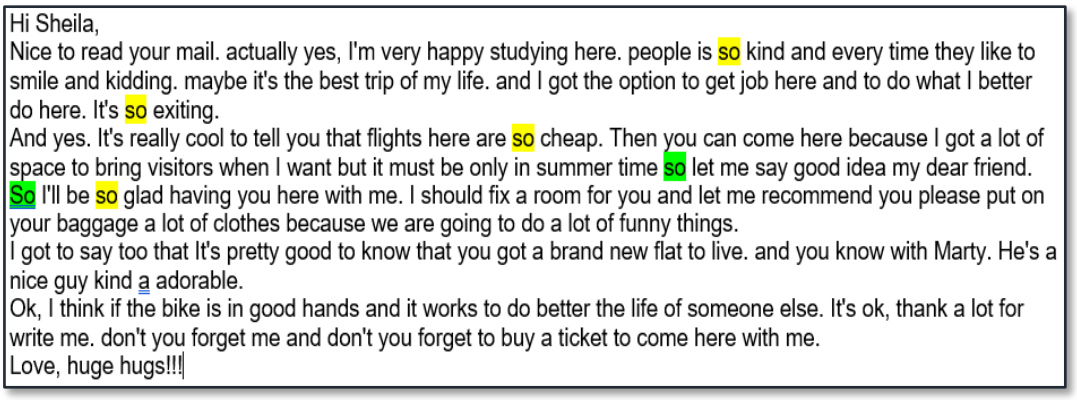

Hi Sheila,
Nice to read your mail. actually yes, I'm very happy studying here. people is so kind and every time they like to smile and kidding. maybe it's the best trip of my life. and I got the option to get job here and to do what I better do here. It's so exiting.
And yes. It's really cool to tell you that flights here are so cheap. Then you can come here because I got a lot of space to bring visitors when I want but it must be only in summer time so let me say good idea my dear friend.
So I'll be so glad having you here with me. I should fix a room for you and let me recommend you please put on your baggage a lot of clothes because we are going to do a lot of funny things.
I got to say too that It's pretty good to know that you got a brand new flat to live. and you know with Marty. He's a nice guy kind a adorable.
Ok, I think if the bike is in good hands and it works to do better the life of someone else. It's ok, thank a lot for write me. don't you forget me and don't you forget to buy a ticket to come here with me.
Love, huge hugs!!!

Figure 7.42 – Different Uses of So in an Email

7.2.3 Connective Predictors of Graded Emails

To identify the connective indexes that best predicted the teachers' grades in emails, a stepwise regression was conducted on nine indexes that met the statistical assumptions. All nine connective indexes and the teacher's email scores showed that residuals might have a positive autocorrelation as assessed by a Durbin-Watson statistic of 1.018. The findings also indicate homoscedasticity as evaluated by visually inspecting the plot of standardised residuals versus standardised predicted values.

The regression results indicated that two variables best predicted the teachers' judgements of the quality of emails. Such variables included the frequency of opposition connectives and the average of all causal connective items. These two connective variables explained a mere 3.6% of the variance (R2 =3.6), F (2, 237) = 4.417, p < .013. (See Table 7.43 for additional information).

Entry	Variable Added	R	r2	*B*	SE	*B*
1	Opposition connectives (frequency)	0.13	0.019	-0.09	0.04	-0.13
2	All causal connective (average)	0.19	0.036	12.86	6.37	0.12
Notes: Estimated Constant Term is 8.134; B is unstandardised Beta; SE is standard error; B is standardised Beta.						

Table 7.43 – Stepwise Regression Findings of Connectives in Emails

These predictors suggest that the frequency of opposition connectives (t = -2.11, p = .036) and the average of all causal connective items (t = 2.01, p = .045) may both be significant predictors in the model.

The most relevant finding to emerge is that the frequency of opposition connectives negatively predicted the grading of emails. This outcome may aid in answering the third research question posed for this, which sought to find out whether L2 writing matched the CFER cohesion requirements and whether those cohesion requirements correlated with the teachers' scores in L2 writing at the B2 proficiency level.

Connective	CEFR Scale	Freq. Per 10k Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
but	A1	69	69	78	150	77.2
maybe	A2	11	80	90	39	12.6
however	A2	4	84	95	18	4.8
yet	A2	2	87	97	8	2.4
on the other hand	B2	1	88	99	5	1.3
perhaps	A2	1	89	100	5	1.3
in spite of	B1	0.2	89	100	1	0.3

Table 7.44 – Opposition Connectives in Emails

The inclusion of an assortment of opposition connectives in L2 writing may reflect the L2 writer's understanding of opposition connectives. However, a closer look at the index supporting this finding shows that a handful of connectives dominated their frequency and occurrence in the texts. In other words, highly frequent opposition connectives (e.g., but) may have influenced (i.e., lowered) the teacher's judgements for assigning scores in emails by L2 writers. (See Table 7.44 above).

This finding also indicates that from a total of eighteen connectives comprising the opposition list, only seven connectives were found in emails. However, what is surprising is that two connectives ('but' and 'maybe') comprised 90% of all the occurrences in emails. (See Table 7.44 above).

This is a troubling finding. Less frequent opposition connectives found in few texts (e.g., perhaps, on the other hand, in spite of), as well as absent connectives (e.g.,

nevertheless, instead, whereas), may have confounded this outcome and consequently may have influenced the teachers' judgements of writing quality.

One last finding was that the index measuring *all causal* connectives predicted the teachers' judgements of the writing quality of emails by L2 writers. This regression outcome indicates that the presence of a variety of causal connective words increased the teachers' judgements of writing quality in emails by L2 writers.

The findings suggest that 'because' dominated this index. However, like in the previous findings, other causal connectives (e.g., so, since), which play different text functions, may have confounded the results. The word 'so', for example, may have confounded the outcomes by performing multiple functions in emails (e.g., adverb, conjunction, adjective). The "all causal connectives" index occurring is summarised in Table 7.45.

Connective	CEFR Scale	Freq. Per 10k Words	Cumulative Frequency	Cumulative Percentage	Number of Texts	% of Each Connective
because	A1	83	83	56	181	55.9
so	A2	45	128	87	105	30.5
make	B1	8	136	92	28	5.3
since	B1	4	140	95	16	2.9
made	A1	3	143	97	10	1.8
makes	B1	1	144	97	4	1.0
although	B1	1	145	98	5	0.8
whenever	B1	1	147	99	5	0.8
cause	B2	1	147	100	3	0.5
provided that	B2	0.2	148	100	2	0.3
only if	A2	0.2	148	100	1	0.2

Table 7.45 – All Causal Connectives Predictor

7.3 Summary of Findings on Connectives in L2 writing

In the analyses of connective words, the most important findings suggest that L2 writers made extensive use of connective words (e.g., and, but, although) required for writing at the B2 level as recommended by the CEFR standards for the teaching, learning, and assessment of writing in English as a foreign language.

The statistical findings suggest the presence of specific connective words (and, but, although) in the collected essays and emails. Specifically, the additive 'and'

was frequently used by L2 writers (e.g., 13.2% in essays and 13.8% in emails). This connective was present in most texts of both datasets (e.g., in 239 essays and 235 emails). Although 'but' was less frequent (1.38% for essays and 3.55% for emails), the conjunctive 'but' was widely used in essays and emails (129 in essays and 150 in emails). Additionally, while the connective 'although' comprised 1% of the total connectives in ninety-seven essays, it was a marginal figure (0.06%), occurring in only five emails.

Perhaps, the most relevant statistical finding on the use of connectives in essays was the variety of connectives concerning the CEFR levels (A1 – C2) used by L2 writers. A total of 140 out of 243 connective items provided by TAACO were found in the essays. The evidence on connectives in essays shows that not only the connective words (33 items) required for writing at the B2 level were found in the analysis, but also other connectives to different CEFR word levels were present in the essay dataset.

Specifically, whilst a small group of high-frequency connective words (e.g., A1 and A2) dominated the essay dataset, the evidence shows a variety of other connective words from other CEFR word levels were found in the essays. Evidence of the presence of other connectives included items regarded as basic level connectives (31 items that belong to the A1 level and twenty-six items at the A2 level), at the intermediate level (39 items at the B1 level and thirty-three items at the B2 level), as well as more advanced level items (10 items at the C1 level and one item at the C2 level).

Likewise, in the analysis of connectives in emails, a variety of connectives that belonged to the different CEFR levels were found. Those included basic level items (29 items at the A1 level and twenty-one items at the A2 level), intermediate level (23 items at the B1 level and twelve items at the B2 level), and very few advanced level items (2 items at the C1 level and none at the C2 level).

Moreover, in examining the relationship between teachers' quality judgements and the average and frequency of connective variables (provided by TAACO), a handful of connective indexes correlate with grades. For the essay dataset, significant negative correlations included the averages of lexical subordinators (-.148), positive causal connectives (-.147), and positive logical connectives (-.131). Findings on emails included a negative correlation between the frequency

of opposition connectives (-.139) and a positive correlation of all causal connectives (0.133).

The regression findings on which connective variables had the greatest association with the teachers' judgements of writing quality (i.e., teacher's grades) suggested that the average of lexical subordinators (e.g., that, because, although) and the average of positive causal connectives (e.g., because, so, if) had a negative association with the teachers' scores, while the frequency of sentence linking connectives (e.g., for, because, as, but, although) positively predicted essay scores. Similarly, the regression findings on connectives in emails indicated that the frequencies of opposition connectives (e.g., but, maybe, however) negatively predicted the scores, while the average of all causal connectives (e.g., because, so, make) positively predicted teachers' judgements of writing quality in emails.

Discussion

8.0 Introduction

This chapter highlights significant correlational and regression findings on the relationship between cohesion features occurring in different text segments and teachers' judgements of quality in essays and emails. It also discusses the main results on the types of connectives used by L2 writers that match the requirements for cohesion in writing at the B2 level and the findings on connective words that may have influenced the teachers' judgements of writing quality.

In that respect, the first part of the chapter summarises, explains, and critically discusses the outcomes detailed in Chapters 5, 6, and 7. The findings may inform the second language teaching field and researchers interested in cohesion in L2 writing. The chapter concludes with a reflective discussion of the strengths and limitations of the research design.

8.1 The Nature of Cohesion in L2 Writing

In recapping and explaining salient findings on cohesion in the texts composed by undergraduate language students, this discussion chapter flags significant evidence related to the literature, theory, and research questions. With that in mind, central to the organisation of this chapter is addressing the main research question: What is the nature of cohesion in second language writing by undergraduates in Ecuador? Specifically, this thesis sought to answer the following research questions:

(RQ1) What types of cohesion relations occur in L2 writing at the sentence, paragraph, and whole-text levels?

(RQ2) What is the relationship between cohesion features (e.g., grammatical and lexical) and teachers' judgements of writing quality?

(RQ3) Do expectations of cohesion by the CEFR match what is found in student writing?

Corpus-based research indicates that automatic tools (e.g., Coh-Metrix and TAACO) have aided in measuring cohesion features in different text segments of L1 and L2 writing (Crossley et al., 2016b, 2019; McNamara et al., 2014).

In addressing the posed research questions, this study utilised the TAACO tool to determine cohesion features occurring in different text segments. Based on the outcomes reported in the previous chapters, the most crucial finding suggests that L2 writers prefer lexical overlap (i.e., word repetition) to link ideas at the paragraph level of the collected essays and emails. In particular, the findings suggest that semantical similarity, lexical overlap features, givenness features, and connective words were relevant cohesion features occurring between sentences, paragraphs, and the entire text.

These findings are significant because they allow us to understand better the linguistic features used by L2 writers to build relations of meaning beyond the sentence level of texts and their relationship with the teachers' judgements of writing quality in essays and emails.

Specifically, consistent with the literature, these findings suggest that lexical overlap (e.g., adjectives, pronouns, content words) and semantical similarity features (e.g., noun synonyms) overlapping between paragraphs were the best predictors of teachers' judgements of writing quality in essays (e.g., Crossley et al., 2016a, 2016b). In addition, the findings enable us to comprehend better that L2 writers not only utilised linguistic features at the paragraph level but also lexical overlap features (e.g., all lemmas) at the sentence level and the entire text (e.g., givenness: content words and pronouns), which also predicted the teachers' scores in essays.

Similarly, the findings allowed this study to precisely determine the linguistic features (e.g., lexical overlap) occurring at the paragraph level of emails. For example, the results indicate the association of specific linguistic items (e.g., nouns, verbs, content words) with the allocation of scores by L2 teachers in the collected emails.

Interestingly, the identified cohesion items positively and negatively predicted the teachers' judgements of writing quality. In the essays, the regression results suggest that while adjectives, pronouns, and synonyms occurring at the paragraph level predicted the increase in teachers' scores, the content words in a two-paragraph span index negatively predicted (i.e., decreased) the teachers' scores in essays. Additionally, the outcomes indicate that all lemmas (i.e., function and content words) at the sentence level increase the teachers' scores.

In contrast, content lemmas and pronouns (i.e., givenness) in the entire text decrease the scores in essays.

In emails, the regression findings suggest that noun lemmas and verb lemmas overlapping between paragraphs (binary) increase the teachers' scores, whereas content words overlapping between paragraphs decrease the teachers' scores.

Some of these regression results were unexpected and propose that cohesion items occurring at the paragraph level can negatively predict the teachers' scores in L2 writing. The results also indicate that cohesion features occurring at the sentence level increase the scores.

Additionally, in addressing the third research question, the findings do indicate the presence of connective words ('and', 'but', and 'although') in essays and emails that match the CEFR expectations on cohesion at the B2 level. However, what is interesting is that connectives also positively and negatively predicted the teachers' scores. For example, the frequency of sentence-linking connectives positively predicted the teachers' scores in essays, while the average of lexical subordinators and positive causal connectives negatively predicted teachers' scores in essays. Likewise, the average of all causal connectives positively predicted the teachers' scores in emails; however, the frequency of opposition connectives negatively predicted teachers' scores in emails.

A note of caution is due here since these findings focus on analysing very fine-grained textual features. The teachers' judgements of writing quality comprised other aspects beyond cohesion (e.g., fluency, originality, grammatical accuracy conventions). In addition, it is possible that these findings may have been skewed by poor statistical evidence. Whilst highly correlated indexes do not imply a cause-and-effect relationship, this study's correlations and regression results were very weak. What is more, the possible interference of confounding factors (e.g., the presence of multifunction connective words) cannot be ruled out. These results, therefore, need to be interpreted with caution.

8.1.1 Cohesion Features Predicting Teachers' scores in Essays

After analysing cohesion in essays, the evidence indicates that adjectives and pronouns overlap at the paragraph level, and all lemmas at the sentence level positively predicted higher grades. In contrast, content lemmas and givenness

features (e.g., repeated content lemmas and pronouns) negatively predict the teachers' judgements of writing quality in essays by L2 writers in Ecuador.

As mentioned in the literature review, the evidence found in this study corroborates that cohesion features enable L2 writers to build relations of meaning in text segments (Halliday & Hasan, 1976; Halliday & Matthiessen, 2013; Hoey, 1991). Likewise, comparing these findings with those of other studies confirms that L2 writers use specific cohesion features to link ideas in different text segments, that is, between and within sentences, between paragraphs, and the entire text. However, some features in L2 writing differ from those found in previous studies on L1 and L2 writing (e.g., Crossley et al., 2016b; Jung et al., 2019).

Notably, in accordance with the present results, previous studies suggest that specific cohesion features occurring in different text segments are associated with the increasing and decreasing of teachers' judgements of writing quality in texts. As is the case of cohesion features found in essays by L2 writers (e.g., Crossley et al., 2016b; Crossley & McNamara, 2012b; Green, 2012; Guo et al., 2013; M. Kim & Crossley, 2018; McNamara et al., 2013; Plakans & Gebril, 2017).

Consistent with the literature, for example, the regression outcomes in this study found that L2 writing that includes lexical overlap items (e.g., adjectives and pronouns) and semantical similarity features (e.g. noun synonyms) occurring at the paragraph level increases the teachers' scores in the collected essays (e.g., Crossley et al., 2016a).

These results further support the idea that lexical, grammatical, and semantical similarity features occurring in larger text segments (i.e., at the paragraph level) are major contributors to the cohesion of a text as proposed by Halliday and Hasan (1976) and other academics (e.g., Hoey, 1991; Martin, 2001).

In particular, the regression analysis in this study found that adjectives overlapping in a two-paragraph span seem to increase the teachers' scores in essays. This finding may be consistent with that of Crossley et al. (2016a), who found a positive correlation between adjectives overlap in adjacent paragraphs and organisation scores in essays by L2 writers.

What is curious about this result is that L2 writers use the repetition of adjectives in larger stretches of a text, that is, beyond adjacent paragraphs. The manual analysis of essays suggests that writers cohere their texts by repeating adjectives across two and three paragraphs. Consequently, it is possible to hypothesise that cohesive texts by repetition of common adjectives in larger stretches of a text (i.e., beyond adjacent paragraphs) may have motivated teachers to allocate higher scores in essays. However, it is unclear to what extent the repetition of quite common adjectives (e.g., important) and unrelated phrases, including adjectives (e.g., many, more), may have influenced the teachers' allocation of higher grades in essays as shown in Figure 8.1.

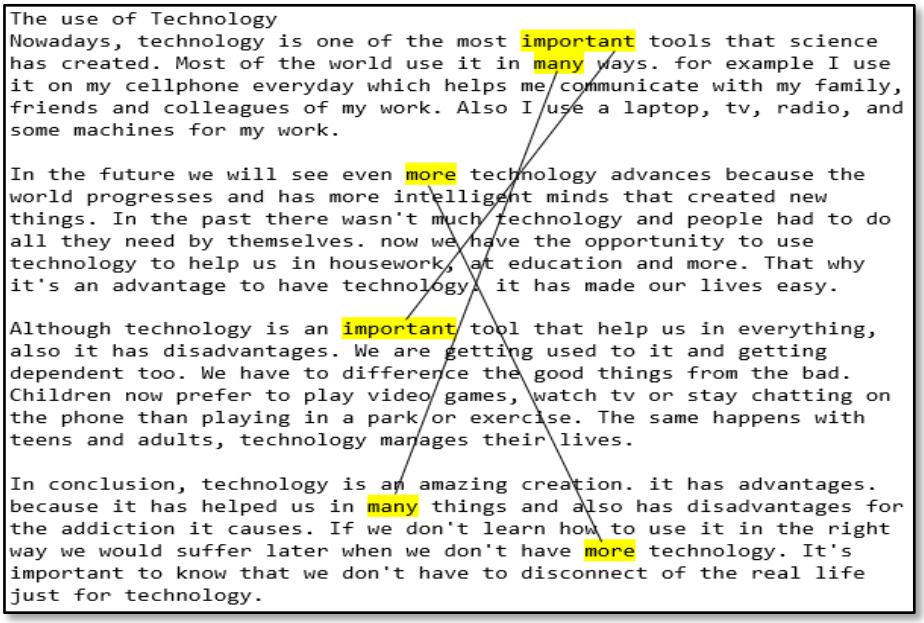


Figure 8.1 – Adjectives Overlap in a Two-paragraph Span

Moreover, correlational findings from previous studies may confirm that semantical similarity features (e.g., synonyms) are positively associated with teachers' scores in texts by L1 and L2 writers. Past studies, for example, suggest that noun and verb synonyms allow writers to link similar ideas using synonyms at the sentence and paragraph levels (e.g., Crossley et al., 2016a, 2016b; Mirzapour & Ahmadi, 2011). Interestingly, this study found that synonyms in the form of nouns (e.g., house: home, abode, dwelling, residence) predicted the teachers' scores in essays.

In particular, the present study found that noun synonymy occurring between paragraphs is associated with higher scores in essays by L2 writers. This

outcome further supports the idea of synonyms used in L1 and L2 writing. As Mirzapour and Ahmadi (2011) note, while there is a tendency to use synonymy and collocations in L1 writing, synonyms and word repetition are typical in L2 writing. That seems to be the case for the collected scored essays by L2 writers in Ecuador. See Figure 8.2.

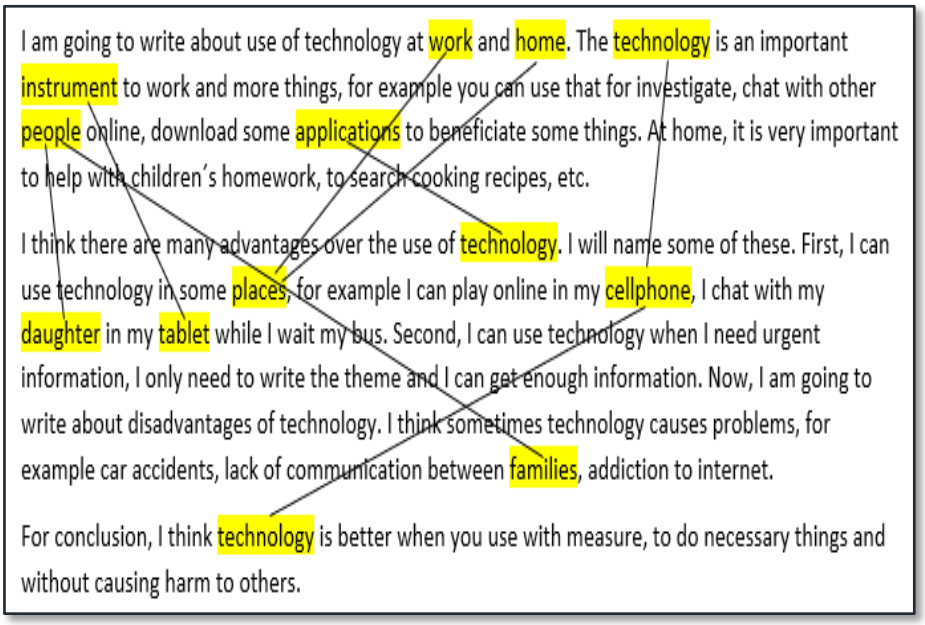


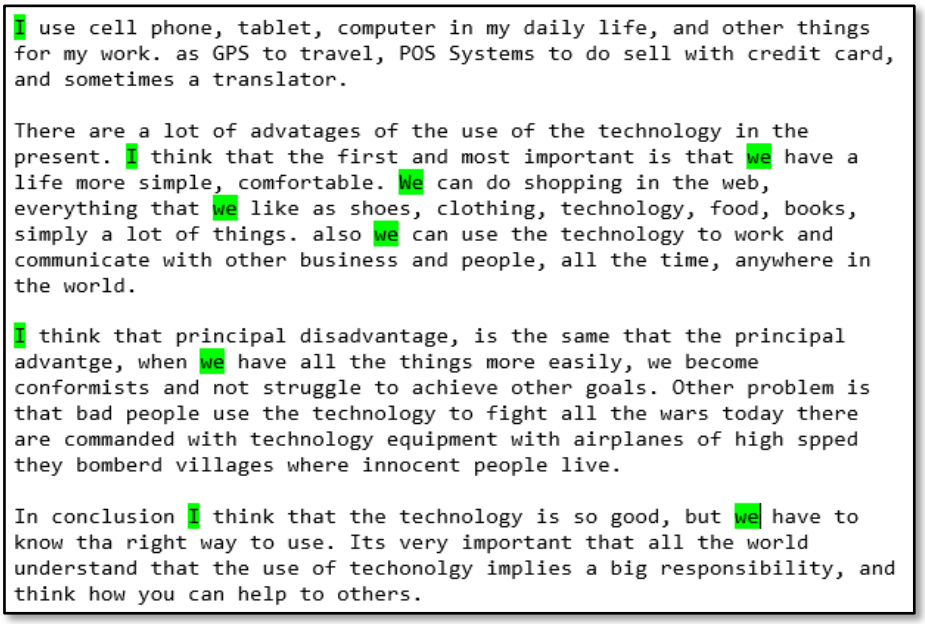
Figure 8.2 – Noun Synonyms Overlap Between Paragraphs

Another important finding in this study is on pronouns that overlap in adjacent paragraphs. The regression findings suggest that pronouns positively predict teachers' higher scores in essays. This finding is consistent with data obtained in the analysis of pronouns in texts composed by L1 and L2 writers. For example, the result in this study may be compatible with that of Crossley et al. (2016b), who found that pronouns positively predicted higher scores with combined scores in essays by L2 writers.

The same study found that pronouns overlapping between adjacent sentences negatively predicted text organisation scores. These results further support the idea that cohesion features (e.g., pronouns) that also occur at the paragraph level positively predict essay quality.

This result on pronouns may add to the evidence of cohesion features at the paragraph level. However, this result may have been confounded by an imprecise automatic identification of different pronouns repeated between sentences and

paragraphs. While describing the correlational and regression findings on pronouns, it was noticed that not all pronouns follow the same anaphoric referential repeated between paragraphs.



I use cell phone, tablet, computer in my daily life, and other things for my work. as GPS to travel, POS Systems to do sell with credit card, and sometimes a translator.

There are a lot of advatages of the use of the technology in the present. I think that the first and most important is that we have a life more simple, comfortable. We can do shopping in the web, everything that we like as shoes, clothing, technology, food, books, simply a lot of things. also we can use the technology to work and communicate with other business and people, all the time, anywhere in the world.

I think that principal disadvantage, is the same that the principal advantge, when we have all the things more easily, we become conformists and not struggle to achieve other goals. Other problem is that bad people use the technology to fight all the wars today there are commanded with technology equipment with airplanes of high spped they bomberd villages where innocent people live.

In conclusion I think that the technology is so good, but we have to know tha right way to use. Its very important that all the world understand that the use of techonolgy implies a big responsibility, and think how you can help to others.

Figure 8.3 – Pronoun Overlap Between Adjacent Paragraphs

The manual analysis, for example, indicates that even though most pronouns link to the same referential as in the case of the pronouns ‘I’ and ‘we’ linking to the same referential in the following paragraphs in most essays, not all personal pronouns had a straightforward relationship (See Figure 8.3 above). Therefore, it is unlikely that all pronouns included in the pronoun index (e.g., I, me, my, it, them) overlapping between paragraphs predicted the teachers’ grades. The pronoun index may have inadequately identified other pronouns overlapping between sentences but repeated in the following paragraph. As a result, the findings on pronouns overlapping between paragraphs must be interpreted with caution.

Moreover, this study found that content words (e.g., verbs, nouns, adjectives) overlapping between two paragraphs decreased the teachers’ scores in essays. Whilst Crossley et al. (2012) found that content words overlapping between sentences negatively correlated with essay scores, this result has not previously been described. This study suggests that content words overlapping between two paragraphs can also negatively predict the lower teachers’ scores in essays by L2 writers. See Figure 8.4.

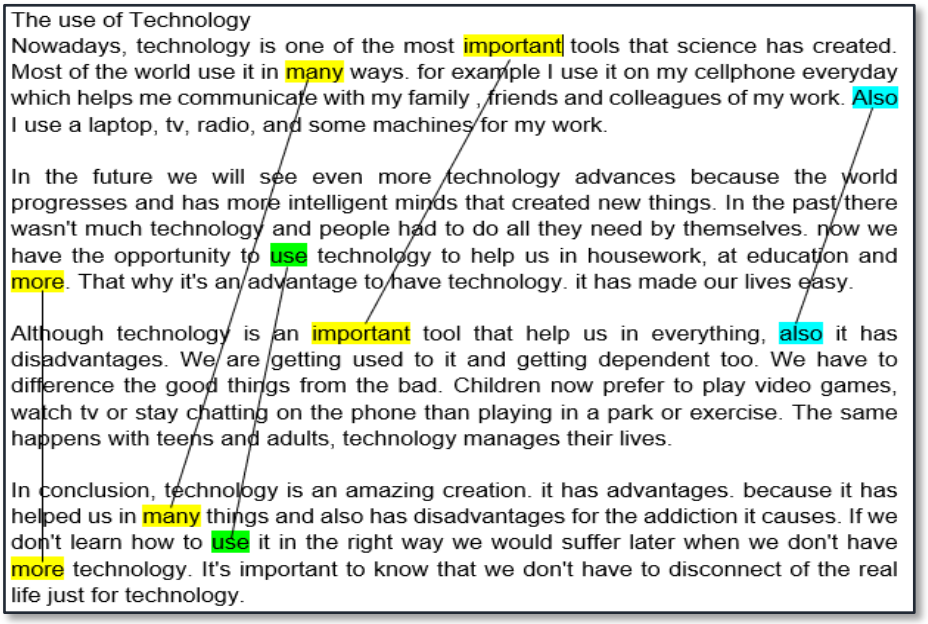


Figure 8.4 – Content Words Overlap in a Two-paragraph Span

It is difficult to explain this result, but it might be related to the types of words comprising the content group variable. As discussed earlier, contrary to the vast number of verbs, nouns, and adverbs comprising the content words index, the limited presence of adjectives in essays may have caused a positive impression on teachers who increase the scores when common adjectives appear overlapping between paragraphs. Perhaps the high-frequency verbs, nouns, and adjectives occurring in a two-paragraph span that mainly comprises the content word results may have caused an opposite effect. That is, the essays were indeed very cohesive. However, the highly frequent words chosen by students seem to have negatively predicted the teachers' judgements of writing quality.

Additionally, it is encouraging to compare these figures with those by Green (2012), who found that writers with low and high L2 proficiency used more content words with a higher word frequency than L1 writers in the English language. A similar outcome was found by Mirzapour and Ahmadi (2011), who reported the overuse of content words in essays by L2 writers when comparing the writing of research articles by L1 and L2 writers. In addition, while these results raise intriguing questions regarding the nature of cohesion in L2 writing, more research is needed to understand better the association between specific cohesion features occurring in text segments and the teachers' judgements of writing quality.

Another important finding indicates that the repetition of all lemmas (i.e., content and function words) at the sentence level increases the teachers' scores of essays by L2 writers in Ecuador. This result, consistent with data obtained by M. Kim and Crossley (2018), may indicate the overreliance on repeating all types of words (i.e., content and function words) to create cohesion between sentences by L2 writers. This finding contradicts previous studies, which have suggested that local cohesion clues are either unrelated or negatively related to essay quality (e.g., Crossley & McNamara, 2012b; McNamara, Louwerse, et al., 2010). For example, McNamara, Louwerse, et al. (2010) found no difference in essay quality as a function of local cohesion (i.e., word overlap) in a corpus of L1 writers. For L2 writing, however, the results are mixed as noticed by Crossley et al. (2016a):

> "Earlier studies report positive relations between cohesion features and essay quality and more recent studies using computational approaches report that more cohesive devices equate to lower scores of essay quality. Notably, the majority of the cohesive devices investigated in these L2 studies have been local in nature." (p. 4)

A possible explanation for this might be that L2 writers rely on using the same referentials (e.g., repeated common nouns and verbs, similar pronouns, overuse of infinitives) to link ideas between sentences. See Figure 8.5.

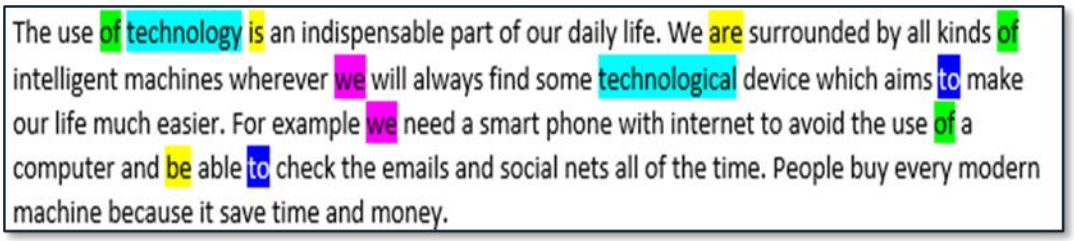
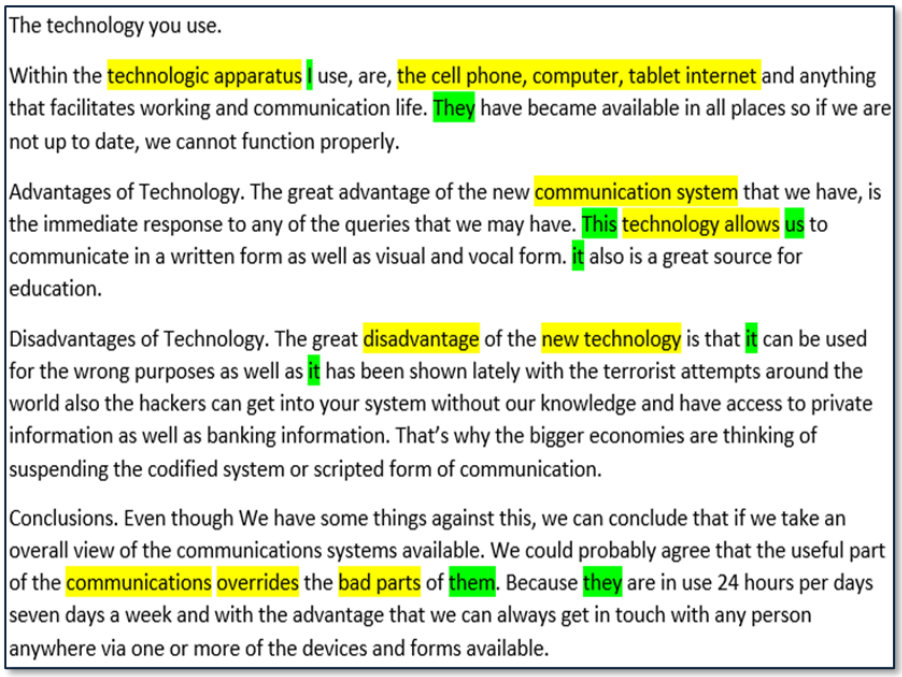


Figure 8.5 – All Lemmas Overlap Between Sentences

The use of less frequent words, less complex sentences, and less diversity of words across sentences may have been deemed as positive aspects to facilitate comprehension for the reader. Busy teachers may have considered those aspects to allocate higher grades in essays.

Finally, repeated content lemmas and third-person pronouns (e.g., it, they, them) aided this study in assessing text givenness, that is, the amount of recoverable information from the preceding discourse in a text. Crossley et al. (2016b) hold

that the calculation of givenness features in a text may aid researchers in better distinguishing between low versus high cohesion versions of a text. See Figure 8.6.



The technology you use.

Within the technologic apparatus I use, are, the cell phone, computer, tablet internet and anything that facilitates working and communication life. They have became available in all places so if we are not up to date, we cannot function properly.

Advantages of Technology. The great advantage of the new communication system that we have, is the immediate response to any of the queries that we may have. This technology allows us to communicate in a written form as well as visual and vocal form. it also is a great source for education.

Disadvantages of Technology. The great disadvantage of the new technology is that it can be used for the wrong purposes as well as it has been shown lately with the terrorist attempts around the world also the hackers can get into your system without our knowledge and have access to private information as well as banking information. That's why the bigger economies are thinking of suspending the codified system or scripted form of communication.

Conclusions. Even though We have some things against this, we can conclude that if we take an overall view of the communications systems available. We could probably agree that the useful part of the communications overrides the bad parts of them. Because they are in use 24 hours per days seven days a week and with the advantage that we can always get in touch with any person anywhere via one or more of the devices and forms available.

Figure 8.6 – Content Words and Third-person Pronouns in the Entire Text

This study found that givenness in the entire text negatively predicted teachers' scores in essays by L2 writers. However, this result has not previously been described. This outcome, for example, is contrary to that of Crossley et al. (2016b), who found that the givenness variable on repeated content lemmas in the entire text positively correlated with the teachers' scores of essay quality and teachers' scores of coherence in essays by L2 writers. The finding in this study may also contradict that givenness indices positively relate to measures of text coherence found in previous studies on L1 writing (e.g., Crossley & McNamara, 2011b, 2011c).

This discrepancy could be attributed to the different indexes used in previous studies to measure the givenness construct in L1 and L2 writing. Indexes that indicate the amount of given information to new information can be undertaken by examining pronoun density, pronoun-to-noun ratios, and repeated content lemmas. For example, Crossley et al. (2016a) found that the pronoun-to-noun ratio in texts negatively predicted the combined scores in L2 writing.

More importantly, according to these data, we can infer that givenness may help researchers determine the number of cohesion features in sentences across the text. However, although the findings presented here may support the notion that teachers and expert raters do not appear to rely on local cohesion features to allocate higher scores in a coherent text, past studies suggest otherwise. Further research should be undertaken to investigate the influence of givenness in its different forms, as is the case of the ratio of content lemmas and third-person pronouns occurring in the entire text, which negatively predicts teachers' scores in essays by L2 writers.

Overall, these findings may explain why some cohesion features positively and negatively predict teachers' scores. These results may even suggest that specific cohesion features (e.g., adjectives, synonyms, pronouns, content words, givenness features) occurring in sentences, paragraphs, and the entire text can predict higher and lower scores in essays composed by L1 and L2 writers. However, it is possible that these results do not represent the actual purpose underlying the teachers' judgements of the quality of the collected essays. Teachers' scores were aimed at a more holistic basis, rather than recognising fined-grained cohesion features (e.g., lexical overlap or givenness).

8.1.2 Cohesion Features Predicting Teachers' Scores in Emails

Similar to the previous section, this part discusses the main findings of cohesion features predicting the teachers' scores in emails. Significant results in the cohesion analysis of emails indicate that noun and verb lemmas overlap between paragraphs positively predict higher scores. In contrast, the repetition of content words in adjacent paragraphs negatively predicts the teachers' scores in emails by L2 writers in Ecuador.

What is curious about this result is that indexes that quantify nouns and verbs individually seem to increase the scores in emails. However, the same nouns and verbs clustered with adjectives and adverbs (i.e., content words index) have an opposite relationship.

Previous studies have reported the positive relations between nouns and verbs, as well as the negative correlation of content words with the teachers' scores in L1 and L2 writing.

The result on noun lemmas repeated between paragraphs in this study has been reported to positively correlate with teachers' scores in previous research on cohesion in L1 and L2 writing (e.g., Crossley et al., 2016a, 2016b; Guo et al., 2013). For example, Crossley et al. (2016b) found that noun lemmas overlapping in two paragraphs positively correlated with raters' scores of coherence and raters' scores of essay quality by L1 writers.

Likewise, in a similar study on cohesion in L2 writing, Crossley et al. (2016a) found that the adjacent overlap of nouns in a two-paragraph span positively correlated with combined scores. Guo et al. (2013) also found that noun overlap correlated with higher scores by raters of L2 writing. In addition, the finding in this study on verb lemmas overlapping between adjacent paragraphs matches those observed in earlier studies on cohesion in L1 and L2 writing (e.g., Crossley et al., 2016a, 2016b).

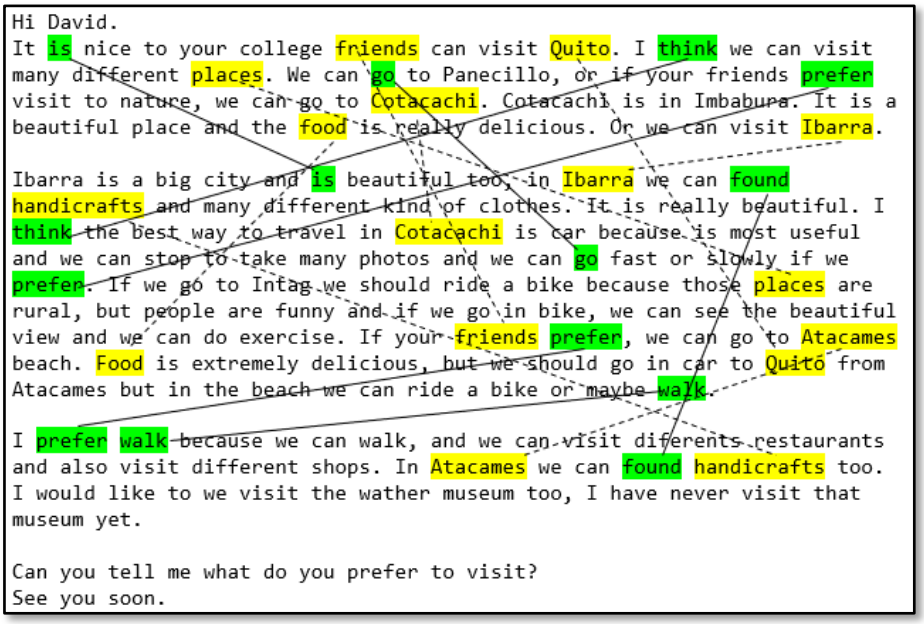
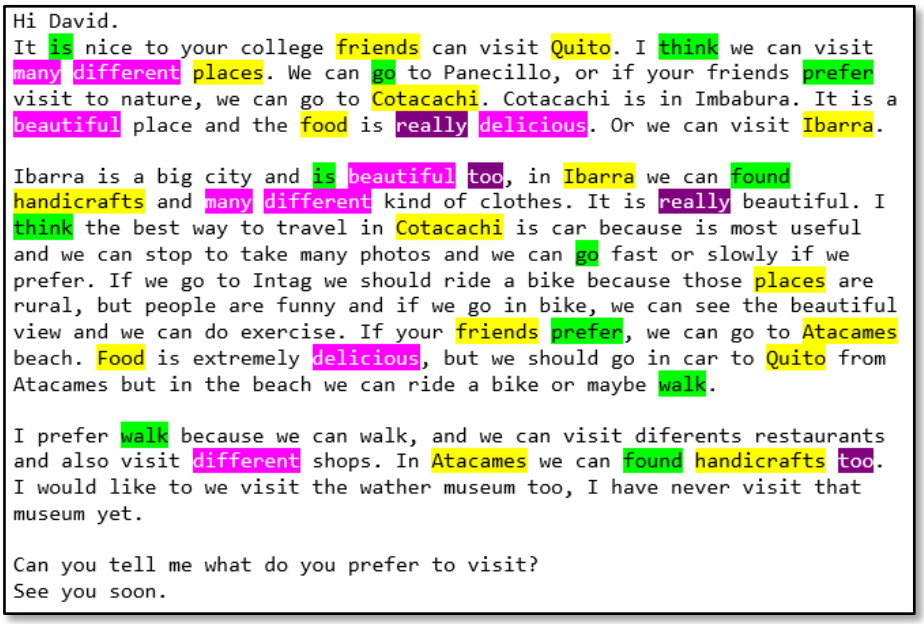


Figure 8.7 – Verbs and Nouns Overlap Between Paragraphs

However, past studies also show that verb lemmas overlap between sentences negatively correlated with raters' scores in compositions by L2 writers (Guo et al., 2013) and negatively correlated with raters' scores of essay quality in essays by L1 writers (Crossley et al., 2016b). Interestingly, those results may confirm the association between cohesion features occurring not in sentences but in larger stretches of a text (i.e., between paragraphs) and their relationship with higher

judgements of writing quality. Nouns (in yellow) and verbs (in green) overlapping between paragraphs in a collected email are presented in Figure 8.7 above.

Moreover, the findings in this study on content words overlapping between paragraphs, which negatively predict the teacher's scores, do not support the previous research. Past evidence suggests a negative relationship between raters' judgements of writing quality in L1 and L2 writing and content words which occur in sentences, not in paragraphs (Crossley et al., 2016b; Crossley & McNamara, 2012b). Content words, highlighted in Figure 8.8, included verbs (highlighted in green) and nouns (yellow) as well as adjectives (pink) and adverbs (violet), which overlap between adjacent paragraphs in an email.


Hi David.
It is nice to your college friends can visit Quito. I think we can visit many different places. We can go to Panecillo, or if your friends prefer visit to nature, we can go to Cotacachi. Cotacachi is in Imbabura. It is a beautiful place and the food is really delicious. Or we can visit Ibarra.

Ibarra is a big city and is beautiful too, in Ibarra we can found handicrafts and many different kind of clothes. It is really beautiful. I think the best way to travel in Cotacachi is car because is most useful and we can stop to take many photos and we can go fast or slowly if we prefer. If we go to Intag we should ride a bike because those places are rural, but people are funny and if we go in bike, we can see the beautiful view and we can do exercise. If your friends prefer, we can go to Atacames beach. Food is extremely delicious, but we should go in car to Quito from Atacames but in the beach we can ride a bike or maybe walk.

I prefer walk because we can walk, and we can visit diferents restaurants and also visit different shops. In Atacames we can found handicrafts too. I would like to we visit the wather museum too, I have never visit that museum yet.

Can you tell me what do you prefer to visit?
See you soon.

Figure 8.8 – Content Words Overlap Between Paragraphs

Perhaps, the inclusion of commonplace content words between paragraphs in emails may have negatively predicted the teachers' scores. In that respect, the manual probe of all texts, along with the averages and percentages on the types and word levels used by L2 writers obtained using the TextInspector software, may indicate the presence of commonplace content words in paragraphs. In particular, the multimethod probe shows that emails included more basic-level words (A1 and A2), very few intermediate-level words (B1 and B2) and a handful of advanced-level words (C1 and C2) than essays. See Figure 8.9.

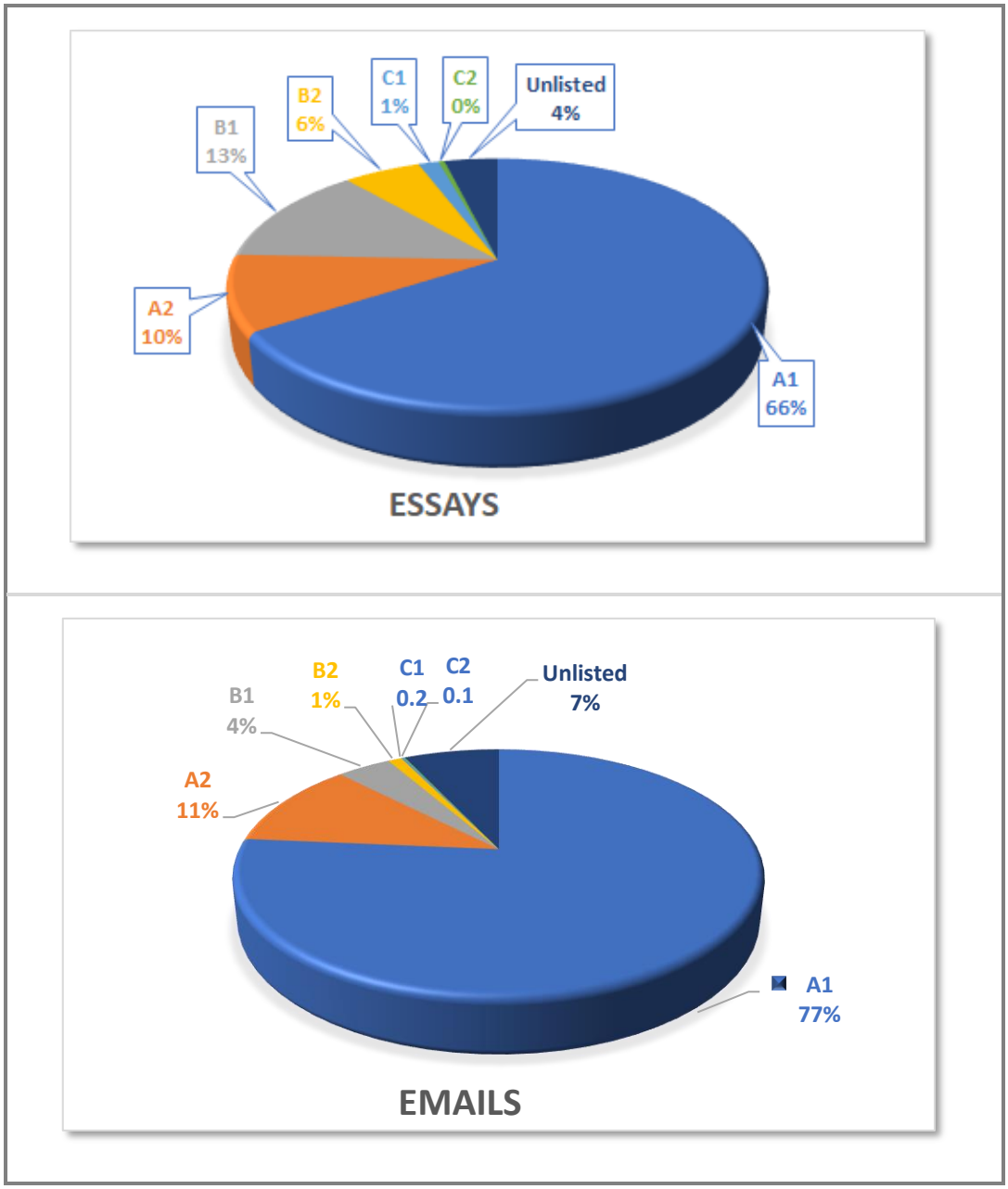


Figure 8.9 – CEFR Level of Words in Essays and Emails

8.1.3 Summary of Cohesion in Text Segments in Essays and Emails

This section discussed the evidence of cohesion features occurring in text segments of essays and emails by L2 writers. In particular, this part discussed the cohesion features in text segments found in the collected essays and emails by highlighting relevant findings. Relevant findings suggest that lexical overlap happening at the paragraph level was the predominant cohesion feature for essays and emails, and lexical overlap cohesion features predicted the teachers' judgements of writing quality in both data sets. In particular, three indexes (e.g., lexical overlap at the sentence level, the semantical similarity between

paragraphs, and givenness in the entire text) predicted the teachers' scores in essays.

Such findings may help find answers to the first and second research questions that sought to determine the types of cohesion relations in text segments (e.g., sentence, paragraph, the entire text) and whether cohesion features correlated with teachers' judgements of writing quality in essays.

Additionally, the outcomes in emails suggest that individual indexes (e.g., nouns and verbs) overlapping between paragraphs positively predict the teachers' scores, while the content index, which includes nouns and paragraphs along with nouns and verbs, negatively predicts the teachers' judgements of writing quality.

8.2 Connective Words in L2 Writing

To answer the third research question, which sought to determine whether the collected texts matched the CEFR expectations on cohesion (i.e., connective words) and whether the connective words found predicted the teachers' scores of the collected texts, this study identified, quantified, and analysed the connective words present in essays and emails by L2 students in Ecuador.

Particularly in essays, the current study found that a variety of connective words were used across each CEFR level (i.e., basic, intermediate, advanced).

However, descriptive statistics suggest that most connectives present in essays belong to the A1 and A2 groups (i.e., basic level). In addition, the results show a sporadic occurrence of connectives regarded as intermediate (e.g., B1 and B2) and a marginal number of advanced connectives (e.g., C1 and C2).

While these findings suggest that the level of connectives according to the CEFR word standards is broadly correct in terms of progression, the results also indicate that L2 writers used more varied connectives in essays than in essays.

See Table 8.10 for descriptive statistics on connective word levels in essays and emails as suggested by the CEFR standards.

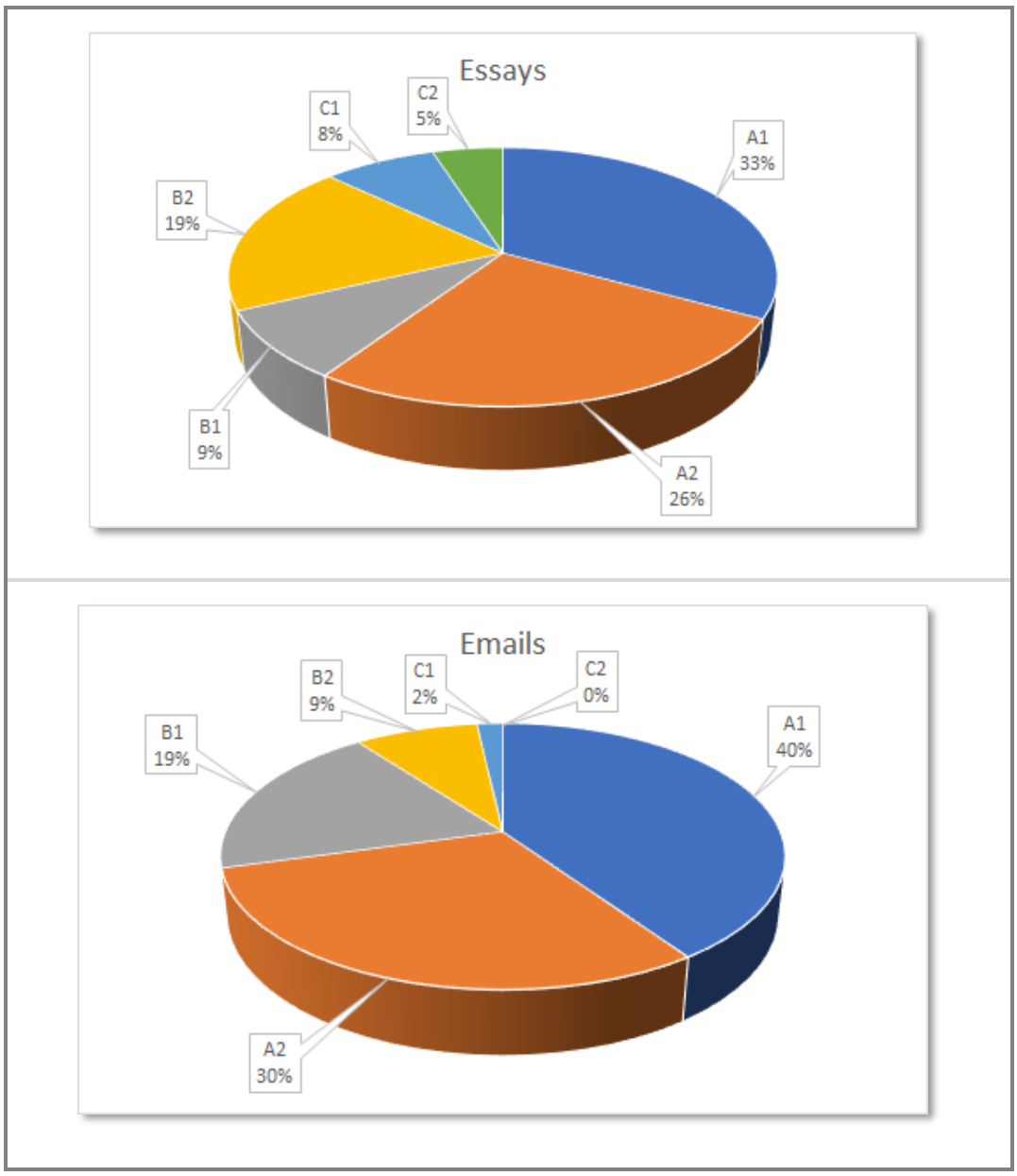


Figure 8.10 – CEFR Connectives Levels in Essays and Emails

More specifically, the findings indicate that the additive conjunction ‘and’, the causal conjunction ‘because’, and the additive adverb ‘also’, are all regarded as first-level or beginner-level connectives (i.e., A1 according to the CEFR word classification standards), were found to be broadly used in essays by L2 writers, for example.

As stated earlier, these results seem consistent with other findings, which suggest that L2 writers tend to include common connective words (e.g., Chanyoo, 2018; Lahuerta Martinez, 2016).

Similarly, in the analysis of connective words in emails, the current study found that L2 writers used highly frequent basic connectives labelled as A1 and A2 levels according to the CEFR word standards. However, an interesting result was that a small group of connective words (e.g., 20) comprised almost 90% of all connectives found in emails.

This result shows that L2 writers preferred basic connectives (i.e., A1 and A2) to clarify propositions in their emails. In addition, while some connectives labelled as B1 and B2 (i.e., intermediate) were found in the dataset, connectives regarded as high-level items (e.g., C1 – C2) were scarce and the least preferred by L2 writers.

Perhaps, a possible explanation for this might be the nature of expression underlying the collected texts; emails are generally more conversational and less formal. As the findings suggest, L2 writers used highly frequent words (e.g., and, also, but) instead of including more formal or alternative connectors (e.g., in addition, as well as, however, unlike).

Another possibility is that in the classification of connectives, the results include items that function differently. However, that is problematic because there is a major difference between conjunctions occurring within sentences (e.g., ‘and’ and ‘but’) and adverbials linking sentences and paragraphs (e.g., ‘In addition’). While the adverbial ‘In addition’ can be omitted entirely, the clause would not make sense without the conjunctions (‘and’ and ‘but’).

Even though it is unlikely that the higher-level connectors (e.g., ‘In conclusion’, ‘Therefore’) would ever occur at the same frequency as lower-level ones, these findings may be relevant in comprehending the types of connectives utilised by L2 writers when composing different types of texts (e.g., essays vs emails).

Furthermore, it has been suggested that connective words (e.g., conjunctions) can help speakers link ideas at the sentence level. Still, more importantly, connectives can help writers cohere their texts by including connectives in larger stretches of a text (e.g., between paragraphs), as stated by Halliday and Matthiessen (2013). In this study, the manual analysis indicates that L2 writers used twenty-eight connective words to link paragraphs in essays and thirty-three

for emails. Table 8.11 shows the preferred connectives by L2 writers to link paragraphs in essays and emails.

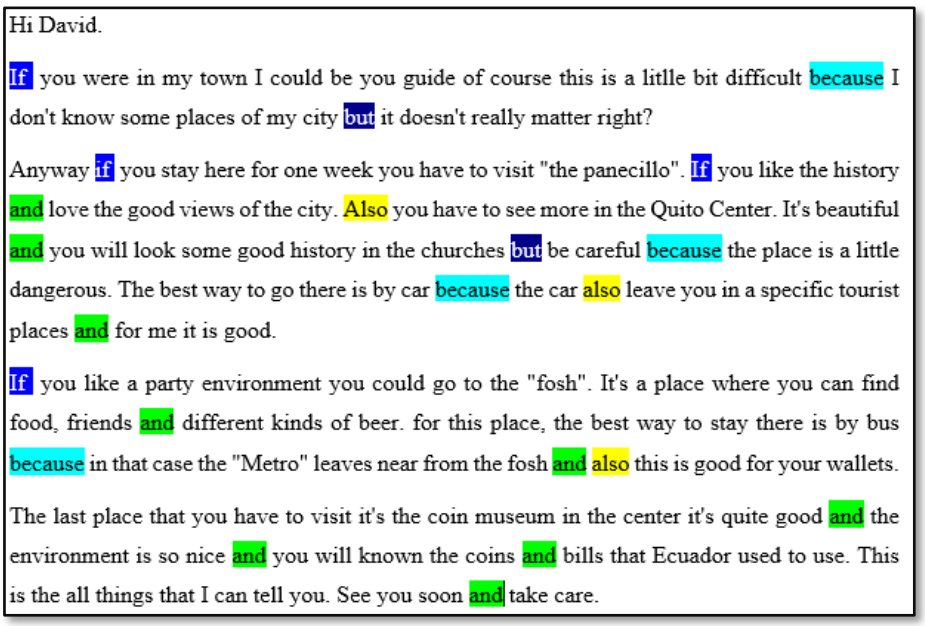
Essays		**Emails**	
Connective	**Word Level**	**Connective**	**Word Level**
Although	B1	First	B2
In conclusion	B2	Finally	A2
Even though	B2	Second	A1
But	A1	Also	A1
Finally	A2	If	A2
As	A1	But	A1
Therefore	B1	So	A2
Another	A2	After	B1
However	A2	Another	A2
Also	A1	When	B2

Table 8.11 – Most Frequent Connective Words to Link Paragraphs

However, compared to the number of connective words found to link ideas between paragraphs, the findings show that L2 writers used far more connectives at the local level of texts.

One possible explanation for this might be that L2 writers prefer to use the lexico-grammatical cohesion features that they feel more familiar with. Perhaps, those connectives that L2 writers already have available in their repertoire for writing short texts in their L1 (i.e., writing in Spanish). For such short texts, the findings indicate that L2 writers hardly use connective words (e.g., In addition, For example, Similarly) to link ideas between paragraphs.

Instead, L2 writers concentrate on developing their propositions at the local level of texts, using connective words to link ideas mainly within sentences and clauses (e.g., and, but, if/because or independent clauses). L2 writers extensively used more connectives to join adjacent sentences and clauses, as the descriptive statistics findings and manual probe of texts seem to suggest in Tables 8.11 above and Figure 8.12.



Hi David.

If you were in my town I could be you guide of course this is a litlle bit difficult because I don't know some places of my city but it doesn't really matter right?

Anyway if you stay here for one week you have to visit "the panecillo". If you like the history and love the good views of the city. Also you have to see more in the Quito Center. It's beautiful and you will look some good history in the churches but be careful because the place is a little dangerous. The best way to go there is by car because the car also leave you in a specific tourist places and for me it is good.

If you like a party environment you could go to the "fosh". It's a place where you can find food, friends and different kinds of beer. for this place, the best way to stay there is by bus because in that case the "Metro" leaves near from the fosh and also this is good for your wallets.

The last place that you have to visit it's the coin museum in the center it's quite good and the environment is so nice and you will known the coins and bills that Ecuador used to use. This is the all things that I can tell you. See you soon and take care.

Figure 8.12 – Connective Words Within Sentences in an Email

Moreover, L2 teachers who follow the specifications presented in the syllabus, instructional, and testing materials to teach students lexico-grammatical cohesion features for writing may be at odds when those descriptions are vague and contradictory. Most teaching materials explain that connective words are portrayed as devices designed to link sentences and clauses. Little attention is given to connective words with a double cohesive function in texts. Connectives may be used to function as cohesion features to link sentences and paragraphs (e.g., For example, But, And) and to link clauses within sentences (e.g., for example, but, and). Halliday and Matthiessen (2013) comment on this double function of connective words:

> "The clause complex thus provides the resources for realizing logico-semantic relations grammatically as tactic patterns. This is the most extensive domain of grammatical structure. However, in the semantic organization of text, logico-semantic relations extend beyond the semantic sequences that are realized by clause complexes; they extend to rhetorical paragraphs and even to whole texts" (p. 609).

In addition, this study furthers the analysis of specific connective words (e.g., and, but, although) stated as prerequisites for cohesion in L2 writing as suggested by the CEFR standards. This study reports to some extent, the presence of other connective words (i.e., discourse markers group), which not only include the syntactic class of conjunctions (e.g., and, but, yet) but also from adverbs (e.g.,

however) and prepositional phrases (e.g., as a result of that) (Fraser, 1999) occurring in the collected essays and emails.

8.2.1 Connectives that Predict the Teachers' Scores in Essays

Along with verifying the connective types in L2 writing, the third question in this study sought to determine the relationship between the connective words and the teachers' judgements of writing quality. In that respect, the findings suggest that three connective variables (e.g., lexical subordinators, sentence linking, and positive causal connectives) best predicted the teachers' judgements of quality in the essay dataset.

These findings, for example, indicate that specific connectives (e.g., but, however, although) on cohesion for writing at the B2 level best predicted the teachers' judgements of writing quality. However, this study has been unable to demonstrate that the additive 'and', a constituent of basic connectives, conjunctions, addition, all additives, and all connectives indexes, correlated or predicted the teachers' scores in essays and emails.

At the same time, the most prominent finding to emerge from the regression findings is that specific indexes positively and negatively predicted the teachers' judgements of writing quality in essays. These findings suggest that the teachers' scores seem to have increased by the presence of sentence-linking connectives (e.g., for, because, as, but, although) while lexical subordinators (after, although, as) and positive causal connectives (e.g., because, this, if) decrease the teachers' scores in essays. However, a note of caution is due here, since these results come from correlations. Other causes beyond connectives may have also influenced the allocation of lower and higher scores.

With that in mind, the findings in this study may help in answering the third research question by specifying the connective words (e.g., but, although, however) that match the requirements on cohesion for the assessment of L2 writing at the B2 level as suggested by the CEFR standards. In other words, this predictor indicates that not only do sentence-linking items (e.g., although, but) match the CEFR requirements on cohesion in L2 writing, but also that sentence-linking connectives seem to predict the teachers' judgements of writing quality of essays by L2 writers.

More importantly, this finding was unexpected and suggested that sentence-linking connectives, which help L2 writers to build relations of meaning between sentences and paragraphs, seem to have predicted the teachers' scores of essays by L2 writers.

However, it is unclear whether all the sentence-linking constituents found in essays predicted the teachers' scores and whether other sentence-linking constituents that perform multifunction roles may have influenced the teachers' decisions to allocate scores in essays by L2 writers. In other words, it is unclear if the sentence linking words occurred between sentences, within sentences or between paragraphs.

Furthermore, a closer look at the constituents of the sentence linking index, for example, indicate that low and intermediate-level connective items (i.e., A1/A2 and B1/B2) as well as less frequent connectives (e.g., B1 and B2) according to the CEFR word standards, comprised this predictor which increases the teacher' scores in essays.

However, while this result has not previously been described, Tian et al. (2021) found that L2 writers paused more when using sentence-linking connectives. Specifically, they found that L2 writers spend less time using lexical subordinators (e.g., if, because, after), for example, to link ideas within sentences. In contrast, L2 writers paused more when using sentence-linking words (e.g., although, but) to connect sentences.

In addition, past research shows that sentence-linking connectives have been found to predict the relationship between linguistic knowledge and performance in math. For example, Crossley, Liu et al. (2017) report that more sentence-linking connectives and function words were predictive of linguistic features and math performance in L1 participants.

However, the findings in this study must be interpreted with caution because this predictor may have been skewed by the predominant incidence of a few sentence-level items (e.g., for, because, as, but, although, when, so) occurring in essays. Those highly frequent items comprising the sentence-linking variables may have influenced the teachers' scores. Table 8.13 shows the most frequent sentence-linking connectives in essays.

Connective	CFER scale	Freq. per 10K Words	Cumulative Percentage	Number of Texts
for	A1	104	26	178
because	A1	73	45	178
as	A1	63	61	151
but	A1	36	70	129
although	B1	26	77	97
when	B2	26	83	91
so	A1	20	89	76
if	A2	16	93	64
since	B1	7	95	29
however	A2	6	96	26
while	A2	3	97	16

Table 8.13 – Most Frequent Sentence-Linking Connectives in Essays

There are, however, other possible explanations. The relevance of sentence-linking connectives in the grading of essays may be related to the writers' efforts to show coherence and their attempts to include connectives that allow them to organise their thoughts in the entire text.

In addition, the present study raises the possibility that these groups of words should have been classified differently. As highlighted previously, the possible interference of extra specific connectives performing multiple linguistic functions cannot be ruled out. While some sentence linking items (e.g., because, but, although) may perform a clear-cut function in the texts to introduce subordinate clauses, other textual items (e.g., for, so, as) seem to function mainly as prepositions (e.g., for), intensifiers (e.g., so), comparatives (e.g., as…as), and rarely as conjunctions in the collected texts.

Another important finding in this study was that simple or single-word lexical subordinators[1] (e.g., before, if) negatively predicted the teachers' scores in essays by L2 writers. The most frequent lexical subordinators are presented in Table 8.14.

[1] For a more comprehensive list, word-class definition, and classification of subordinators, see Liu (2014).

Connective	CFER Scale	Freq. per 10K Words	Cumulative Percentage	Number of Texts
that	A1	147	41	222
because	A1	73	61	178
as	A1	63	78	151
although	B1	26	86	97
if	A2	16	90	64

Table 8.14 – Most Frequent Lexical Subordinators in Essays

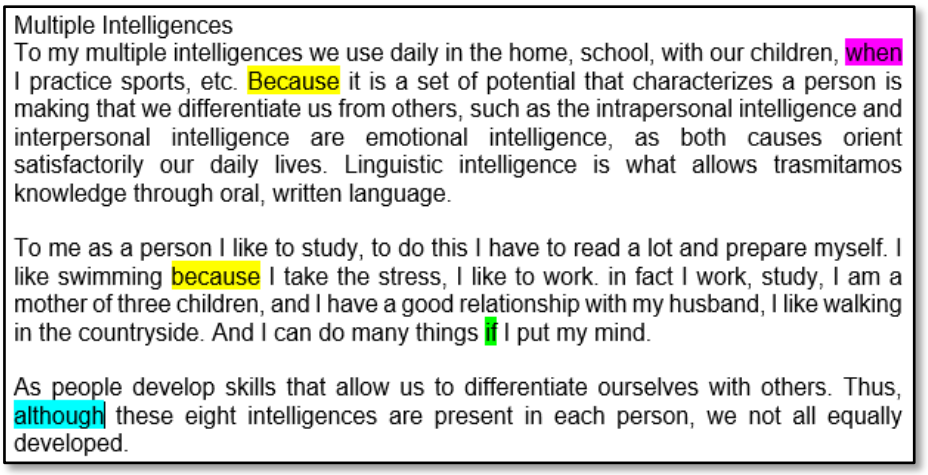
As in the previous findings, this type of connectives included highly frequent ones that may influence these results. For example, a group of common connectives (e.g., that, because, as, although, and if) comprised 90% of all lexical subordinators found in essays (see Table 8.14 above).

The subordinators included were mostly words regarded as basic level items (e.g., that, because, as, if, before, while), a few intermediate items (e.g., although, since, wherever), and a handful of more advanced connectives (e.g., though) as suggested by the CEFR word levels.

However, this outcome is contrary to that of Crossley et al. (2016a), who found that single-word subordinators (see Liu, 2014) positively correlated with raters' combined scores in essays by L2 writers. Previous studies also suggest a contrasting influence of lexical subordinators in L1 and L2 writing. For example, Tian et al. (2021) found that L2 writers pause less when using more lexical subordinators at the sentence level (i.e., within a sentence).

Tywoniw and Crossley (2019) also found that more lexical subordinators were present in the integrated writing (i.e., writing task that includes listening and reading) than in the independent writing TOEFL examination section. Additionally, Staples and Reppen (2016) found differences in lexical subordinators in texts by L1 writers of different linguistic backgrounds (e.g., Arabic, Chinese, and English). Specifically, they discovered that English L1 writers use the connectives 'while' and 'although' while Arabic and Chinese L1 writers tend to use 'so that' and 'after' more frequently. In that respect, this study found that L2 writers in Ecuador make extensive use of 'that', 'because', 'although', and 'if' to connect ideas in essays. More importantly, this finding may

confirm that connectives functioning inside the sentence are not linked to higher scores by L2 teachers, as an essay sample in Figure 8.15 suggests.



Multiple Intelligences
To my multiple intelligences we use daily in the home, school, with our children, when I practice sports, etc. Because it is a set of potential that characterizes a person is making that we differentiate us from others, such as the intrapersonal intelligence and interpersonal intelligence are emotional intelligence, as both causes orient satisfactorily our daily lives. Linguistic intelligence is what allows trasmitamos knowledge through oral, written language.

To me as a person I like to study, to do this I have to read a lot and prepare myself. I like swimming because I take the stress, I like to work. in fact I work, study, I am a mother of three children, and I have a good relationship with my husband, I like walking in the countryside. And I can do many things if I put my mind.

As people develop skills that allow us to differentiate ourselves with others. Thus, although these eight intelligences are present in each person, we not all equally developed.

Figure 8.15 – Common Lexical Subordinators Found in Essays

This finding on single lexical connectives used to introduce clauses at a subordinate level may aid in answering the third research question. This finding suggests that specific connectives (e.g., although, but) matched the cohesion requirements to assess writing at the B2 level. The result also shows that lexical subordinators negatively predicted the allocation of high scores in essays by L2 teachers.

One last important finding in the analysis of connectives in essays was that the index that determines *positive causal*[2] words (e.g., because, as a result, only) negatively predicted the teachers' scores. This finding is consistent with that of Jung et al. (2019), who found that the positive causal connectives negatively predicted L2 writing proficiency. Mainly, their study found that high-proficiency writing samples included a more negligible incidence of positive causal connectives.

Similarly, Jung et al. (2015) found that the inclusion of positive causal connectives negatively predicted L2 essay quality. Interestingly, they maintain that regardless of the specifications of the writing criteria suggesting the inclusion of causal connectives, Jung et al. (2015) outcomes found that more proficient writers

[2] See Louwerse (2001) for a more comprehensive view of causal relations and categories.

include fewer positive causal connectives at the local level of a text. Consequently, raters may not have been influenced by cohesive devices occurring in sentences (e.g., causal connectives) but by the presence of cohesive devices in more extensive stretches of a text.

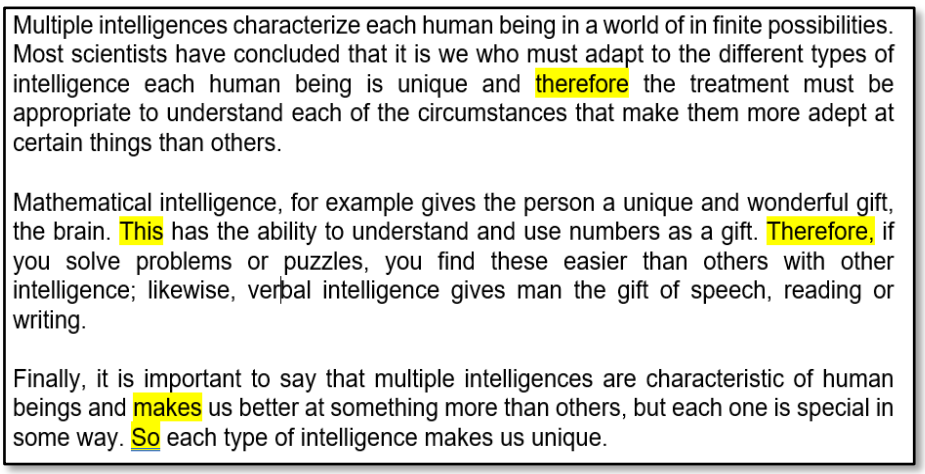
Those outcomes may also agree with those obtained by Crossley and McNamara (2009), who found that L2 writers used less causal cohesion than L1 writers. Similarly, Green (2012) found a significant difference between the amount of causal content in texts written by L2 and L1 writers. More relevant, this finding on positive causal in L2 writing may explain the lowering of teachers' grades as noticed by Crossley and McNamara (2009):

> "Texts with less spatial and causal cohesion likely provide the reader with fewer linguistic features with which to build coherent textual representations. This could influence text processing and comprehension" (p. 131).

Crossley et al. (2016a) also found that positive causals in sentences positively correlate with raters' scores. Specifically, their findings show that positive causal connective words are related to raters' organisation scores and combined scores in essays by L2 writers. Interestingly, in the same study, they found that the incidence of *all causal* connectives index that includes positive and negative causal connectives and causal links (i.e., causal verbs and causal particles) reported a negative correlation with combined scores in essays by L2 writers. In addition, the outcome of this study is contrary to that of Tian et al. (2021), who found a significant positive correlation of positive causal connectives as an indicator of L2 students' writing fluency.

However, it is unclear whether the scores provided by the automatic analyser measured the positive causal connectives between sentences, within sentences, or between paragraphs. A possible limitation in this finding for determining the positive causal connectives occurring in specific text segments of a text cannot be ruled out.

Particularly, the findings in this study indicate that L2 writers use positive causal connectives to link ideas between sentences and within sentences. But their presence may have negatively impacted the teachers' scores. The following example in Figure 8.16 shows these differences.


Multiple intelligences characterize each human being in a world of in finite possibilities. Most scientists have concluded that it is we who must adapt to the different types of intelligence each human being is unique and therefore the treatment must be appropriate to understand each of the circumstances that make them more adept at certain things than others.

Mathematical intelligence, for example gives the person a unique and wonderful gift, the brain. This has the ability to understand and use numbers as a gift. Therefore, if you solve problems or puzzles, you find these easier than others with other intelligence; likewise, verbal intelligence gives man the gift of speech, reading or writing.

Finally, it is important to say that multiple intelligences are characteristic of human beings and makes us better at something more than others, but each one is special in some way. So each type of intelligence makes us unique.

Figure 8.16 – Positive Causal Connectives in Sentences

However, this finding cannot explain the association of positive causal connectives with larger text segments. In other words, the result falls short to indicate whether positive causal connectives influence the reader when those connectives (e.g., therefore, Therefore) appear within sentences or between sentences or paragraphs.

8.2.2 Connectives that predict the Teachers' Scores in Emails

The analysis of emails suggests that all causal connectives and opposition connectives best predict the teachers' judgements of writing quality. Specifically, the regression analysis indicates that the average of all causal connectives (e.g., although, consequently) increases the teachers' scores. In contrast, the incidence of opposition connectives (e.g., but, however) decreases the scores in emails.

Graesser et al. (2004) hold that "a verb is considered causal if the action or event it represents causes something to happen" (p. 200). They also maintain that causal particles (e.g., conjunctions, transitional adverbs) can help the reader connect events and actions in the entire text. In that respect, the findings in this study on all causal connective words (i.e., causal verbs and causal particles) positively predict the teachers' judgements of writing quality. However, this result has not previously been described. This result, for example, is contrary to that of Crossley et al. (2016a), who found that all causal connective words negatively correlated with the raters' scores in the essays by L2 writers. The outcome by Crossley and colleagues is in accord with recent studies indicating that

connective words overlapping at the sentence level of a text negatively correlated with raters' scores in essays by L2 writers.

This discrepancy could be attributed to the inability of automatic analysers to determine causal connectives occurring in specific text segments. In that case, it makes sense to heed causal words as local sources of cohesion. Unfortunately, what is unclear is that the results on all causal connectives fall short of determining the influence of causal words overlapping between sentences, let alone between paragraphs.

This result suggests that using causal connectives in larger text segments may have positively influenced the teachers' judgements of writing quality. However, the descriptive statistics indicate that a small group of causal connectives that occur at the sentence level (e.g., because, so, make, since) dominate the incidence in emails.

Even though the results indicate that the connective 'because' plays an essential role in these findings, previous studies explain the difficulties faced by L2 writers when using this connective. For example, Springer (2012) found that L2 writers tend to overuse clauses that include the connective 'because' and other devices that refer to causal meaning relations.

However, this outcome needs to explain the positive relationship with higher grades in emails. A possible explanation for this might be that causal connective words (e.g., because) may have aided L2 writers in completing the email writing task required to provide arguments in a cause-effect structure. This text-type characteristic cannot be ruled out. Teachers' may have deemed that aspect necessary for allocating higher grades to emails by L2 writers in Ecuador.

There are, however, other possible explanations. Other causal constituents may have also confounded this outcome. Connectives such as 'so', which functions as an adverb, conjunction, and adjective, may have confused the results. For example, while L2 writing shows instances of the conjunction 'so' at the beginning of sentences to link it with something mentioned previously, the findings show that the word 'so' performs other functions. The manual probe indicates that 'so' also functions as an adverb to emphasise what speakers are saying (e.g., I love him so much), to give a short answer (e.g., I think so), and to provide the size of

something (e.g., the bag was so big). Likewise, the connective 'since' is another causal connective that is unlikely to contribute positively to allocating higher grades. The results indicate that 'since' is mainly used as a preposition rather than referring to a cause-effect situation (e.g., because).

Another important finding was that the incidence of opposition connectives throughout the text negatively predicted the teachers' judgements of writing quality in emails by L2 writers in Ecuador. This outcome differs from that of Lahuerta Martinez (2016), who found a significant positive relationship between connective words (e.g., adversatives, additives, causals) and writing quality. Her study, however, found that adversative connectives (e.g., however, but) were among the most problematic for L2 writers.

Previous studies on opposition connectives and teachers' scores have also reported non-significant results (e.g., Alarcon & Morales, 2011; Kuzborska & Soden, 2018). For example, Kuzborska and Soden (2018) found no significant correlations between opposition expressions and writing scores in essays by L2 graduate writers of L1 Chinese background. Their study, however, aimed at disentangling the nuances occurring in the use of opposition relations (e.g., contrast, concessive, corrective) found in essays by L2 writers (e.g., Izutsu, 2008). Table 8.17 shows the most frequent opposition connectives in emails.

Connective	CEFR Scale	Freq. Per 10K Words	Cumulative Percentage	Number of Texts
but	A1	69	78	150
maybe	A2	11	90	39
however	A2	4	95	18
yet	A2	2	97	8
on the other hand	B2	1	99	5
perhaps	A2	1	100	5
in spite of	B1	0.2	100	1

Table 8.17 – Opposition Connectives in Emails

In addition, the findings suggest that an assortment of opposition connectives were used in emails by L2 writers. That may reflect the L2 writer's understanding of opposition connectives. However, a closer look at the index supporting this

finding shows that a handful of connectives dominated their frequency and occurrence in the texts. In other words, the presence of highly frequent opposition connectives (e.g., but) may have influenced (i.e., lowered) the teacher's judgements for assigning scores in emails by L2 writers. More importantly, this finding may confirm the association between cohesive features occurring at the sentence level of emails. The results, for example, indicate that the connective 'but' mainly was used to join clauses rather than to help L2 writers to contrast ideas between sentences or paragraphs.

8.2.3 Summary of Connectives in Essays and Emails

This section discussed the main findings on connectives in the collected essays and emails. Specifically, the evidence suggests that sentence-linking connectives positively predict the teachers' scores while lexical subordinators and positive causal connectives negatively predict the teachers' scores in essays. Similarly, the evidence on connectives in emails indicates that while all causal connectives positively predict the teachers' scores, opposition connective words negatively predict the scores. These findings provide answers to the third research question, which sought to find out whether specific connective terms (e.g., but, although, however) matched the requirements on cohesion for the assessment of L2 writing at the B2 level as suggested by the CEFR standards.

8.3 Limitations of the Study

The current research is restricted in various aspects. It should be noted that this study has been primarily concerned with the set of lexico-grammatical resources aimed at building relations of meaning in short essays and emails composed by undergraduates of English as a foreign language in Ecuador. Although cohesion in writing is central in the elements encompassing the communicative language competencies as suggested by the CEFR standards for teaching, learning, and assessing the English language, this study overlooked other essential details required for composing and allocating higher scores in texts.

Perhaps, further analyses on linguistic competence attributes (e.g., vocabulary range and control, grammatical accuracy, orthographic control), sociolinguistic competence (e.g., communicational appropriateness), and extra pragmatic competences (e.g., flexibility, thematic development, coherence, propositional precision) could have provided better insights about L2 writing. For example,

while coherence was indirectly addressed by analysing the teachers' judgements of writing quality, this study did not directly address coherence. Instead, this study focused on some grammatical and lexical elements as the resources used by L2 writers to cohere their essays and emails.

The input of cohesion elements into the L2 students' repertoire is also beyond the goals of the current study. The manner cohesion is taught and presented in teaching materials (e.g., textbooks, digital learning materials), for example, are two further aspects that were not considered in this study. That is important because the schools where the texts were collected utilise textbooks containing cohesion explanations for writing development. In addition, it is unclear whether teachers expanded that knowledge and whether those explanations on cohesion influenced the collected compositions.

Moreover, the present study was subject to some potential methodological weaknesses. The findings of this study, for example, are restricted to weak correlation coefficient values, which may signal an unsubstantial relationship between cohesion indexes and the dependent variable (i.e., teachers' judgements of writing quality). In that respect, one source of weakness in this study that could have affected the measurements of the dependent variable was the discrete scales associated with teachers' scores on a scale of 1 to 10 points. For example, a closer analysis of the collected texts revealed that texts with low scores (e.g., less than five points) had to be removed because they included too many errors (e.g., not enough words, extensive grammatical and lexical mistakes). In the end, only texts scored with more than five points were kept. That decision seems to have affected the statistical analysis by providing very weak correlations.

In addition, even though the basic requirements for the analysis of cohesion were met, the collected texts had at least 140 words divided into sentences and paragraphs; those may be too short if the notion of cohesion emphasises relations of meaning in larger segments of a text. Further studies may consider these factors as necessary for analysing cohesion in L2 writing.

An additional uncontrolled factor is the possibility that independent variables (e.g., TAACO indexes), programmed to measure a variety of cohesion features, may have yielded confounding results as emphasised in Chapters 6 and 7.

In particular, this study was not specifically designed to evaluate factors related to limitations underlying the analysis of cohesion using automatic tools such as TAACO. While some cohesion features (e.g., word repetition in sentences and paragraphs, synonyms between paragraphs, and connectives in the entire text) were measured using TAACO, the tool falls short to analyse other important cohesion features and relationships occurring in the data collected. Specifically, TAACO indexes overlooked referentials (e.g., anaphoric and cataphoric) inherent within pronominals, comparatives, demonstratives, and the 'definite article the' as well as the substitution and ellipsis categories.

Additionally, in an attempt to determine the influence of lexical cohesion relations in texts, TAACO provides semantical similarity measures (e.g., Latent semantical analysis) that claim the measuring of lexical items occurring in text segments. However, not only TAACO ignores the measuring of other lexical items (e.g., antonyms), but also the outcomes on lexical cohesion measures based on latent semantical analyses (e.g., LSA, LDA, word2vec) need to be taken with caution, as some scholars warn on using LSA methods (e.g., Marcus, 2018; Suleman & Korkontzelos, 2021).

Moreover, TAACO's indexes fail to distinguish the presence of connective words occurring within sentences and the use of connectives between sentences and paragraphs. Similarly, TAACO's outcomes on connective measures need to be taken with caution because the tool cannot differentiate the multifunction of connectives (e.g., conjunction, preposition, adverb).

Case in point, the category of connectives includes both conjunctions and adverbials, but they perform different grammatical functions. While the guidelines warn that it is inaccurate to link clauses with adverbials, it is a widespread practice in L1 writing to use 'however' as a conjunction, for example. Similarly, in general, it is adverbials that connect across sentences and paragraphs, not conjunctions. In this respect, TAACO is limited to identifying these differences.

Another limitation is that this study has only emphasised the cohesion features identified by TAACO (e.g., word overlap or repetition, synonyms, givenness, and connectives). As already mentioned, other cohesion features such as referentials—which can be replaced by pronominals, demonstratives, the article

'the', and comparative items—ellipsis and substitution were widely ignored in the current study.

Interestingly, to address that limitation, Tian et al. (2021), for example, used not only the TAACO analyser, but also they used the Simple NLP tool (Crossley, Allen, Kyle & McNamara, 2014) to identify and calculate personal references (e.g., pronouns), as well as the part-of-speech tags reported by spaCy v2.2 (Honnibal & Johnson, 2015) to identify and quantify comparative referentials in essays by L2 writers.

Finally, the collection of texts, which mainly included short essays and emails, from only two schools may be another limitation. In addition to this, other texts (e.g., review, article, report, formal/informal letter, or email) required to assess English at the B2 level may have enabled this study to better understand cohesion in L2 writing. In that respect, the resources, the time, and the circumstances (e.g., limited access to schools due to the Covid-19 pandemic) were obstacles for this study undertaken by a single researcher.

Conclusion

9.1 Policy and Practice

The findings of this study, which aimed to determine the set of lexico-grammatical features used by L2 writers to build relationships of meaning in sentences, paragraphs, and the entire text, have several practical implications for future policy, practice, and research. However, the following directions seem to be more relevant at this point.

Greater efforts are needed to ensure that research outcomes enable course planners, teachers, materials developers, and evaluators to undertake joint decision-making for the teaching, learning, and assessment of L2 writing.

Firstly, in the planning of L2 courses, these research results could aid course planners to focus more on the various cohesion features occurring in different text segments. This is relevant because the CEFR guidelines barely mention the various cohesion features available for L2 planning (e.g., Council of Europe, 2018).

Drawing from the cohesion model developed by Halliday and Hasan (1976) to analyse organisation and textual connexion clues manually and automatically in writing, this study could provide course planners with a more comprehensive understanding of cohesion in L2 writing. For example, supported by the theory of cohesion, the findings of this study could aid to understand better the specific types of cohesion features (e.g., word repetition, synonyms, givenness) occurring within sentences, between paragraphs, and the entire text. More precisely, course planners may deem this type of research as relevant to align L2 instruction along with the specifications on cohesion in writing expected by the CEFR levels (e.g., basic, intermediate, and advanced).

Secondly, another practical implication for L2 instruction is that the findings in this study suggest that essays and emails comprise distinct types of cohesion features. These findings could aid L2 planners and teachers to consider the inclusion of specific cohesion features (e.g., referentials, connectives) in different types of texts. This is crucial because the CEFR guidelines fall short to describe the cohesion features to be used in different text types and genres. For example, depending on the students' proficiency level, L2 planners and teachers could

better decide on the types of cohesive devices (e.g., connectives) or cohesion relations (e.g., referentials) required for the writing of various text types (essays, emails, reports, articles, reviews).

Yet, although barely mentioned in this study, L2 course planners and teachers may emphasise the development of crucial cohesion features (e.g., collocation and the use of various cohesion features within sentences), which characterises L1 writing. As differences between the outcomes of the current study and previous research outcomes seem to suggest that L2 writing is broadly characterised by the presence of word overlap/repetition and synonymy, while L1 writing involves a marked presence of collocations and synonyms.

Thirdly, while TAACO findings should be interpreted with caution, this study combined automatic and manual analyses aimed to exemplify better the most relevant findings drawn from statistical findings (e.g., correlational and regression). Even though manual analyses may be deemed expensive and time-consuming, these manual representations may provide important insights into the role of combining automatic tools (e.g., TAACO, SPSS, TextInspector) to manually illustrate cohesion items and relationships.

The manual descriptions will be of interest to researchers interested in furthering the analysis of cohesion in essays and emails written by L2 undergraduates. More importantly, the manual descriptions may provide the opportunity to comprehend better the strengths and limitations when using automatic tools in cohesion enquiry. For example, the manual analysis may help understand better the nature of cohesion in texts by showing that L2 writers heavily relied on using word overlap between sentences and paragraphs, the use of synonyms, and the relevance of connective words in the entire text. Simultaneously, the manual probe reveals the limitations of automatic tools and research procedures. That is, the manual probe of connective words seems to suggest that words perform different functions (e.g., conjunctions, adverbs, prepositions) in texts, automatic tools, thus far, seem unable to fully identify, classify, and count accurately those differences.

Fourthly, these findings may have some significant consequences for the broader domain of L2 materials development. Most teaching and assessment materials focus on the drilling and evaluation of connective words as the primary source of

cohesion of a text (e.g., Azar, 2003; Langan, 2013; Oshima & Hogue, 2006). The adopted approach to present, explain, and practice cohesion features in teaching materials, that is, textbooks, writing manuals, and resource books, is vast and contradictory (Kelly & Gargagliano, 2005; Langan, 2013; Oshima & Hogue, 2006; Parrot, 2010; Richards & Sandy, 2014b; Zemach & Islam, 2011).

Particularly, research findings could help narrow the different views on cohesion. In their Writing Academic English manual, Oshima and Hogue (2006), for example, introduce the repetition of key nouns to achieve coherence in paragraphs. The findings in this thesis and previous research on cohesion may agree with that explanation of key noun repetition and provide further evidence on the distinct types of lexical features occurring between sentences and in different paragraphs.

Additionally, in his Grammar for English Language Teachers, Parrot (2010) details to some extent, the use of connective words or discourse makers to "introduce or separate substantial 'blocks' of text (e.g. however, furthermore) or whether they tend to be used with shorter stretches (e.g. as well)." (pp. 301-302).

The findings on connective words in this study concur with the explanations given by Parrot. However, he also maintains that:

> "there is no universally agreed way of classifying discourse markers…Inevitably, we have to oversimplify when we divide them into categories of meaning and use, and in reality, the categories overlap" (Parrot, 2010, pp. 301-302).

Furthermore, the use of connective words (also known as transition words) in teaching materials is vague. The explanation of sentence connectors, for example, seems to suggest that L2 students already know the differences between cohesion within sentences (i.e., between clauses) and between sentences. A case in point is the difference between the connector 'for example' at the beginning of a sentence versus its use in the middle or at the end of a sentence. Teaching materials either overlook this aspect or assume that teachers should explain the differences.

Ultimately, what is at stake here is the persistent bad outcomes reported by local educational officials and external L2 evaluators. Results reported by various institutions (e.g., the British Council, EFEPI, Cambridge Exams, TOEFL) on the

learning of English and, more specifically, on writing by L2 students in Ecuador indicate that L2 students' attainment is among the lowest in the region.

9.2 Further Research

These results open the door to studies that include other text types required at the B2 level (e.g., reports, reviews, informal emails, stories, and articles). It would be interesting to compare the cohesion features used by L2 writers in each text type and new evidence that may help us better understand the cohesion features occurring in different text segments and whether those features correlate with the teachers' judgements of writing quality.

Similarly, these findings may be helpful for the exploration of cohesion in writing at lower levels (A1, A2, and B1) and the cohesion in texts required at those levels (e.g., articles, emails, picture stories). More relevant, exploring cohesion at lower levels of L2 proficiency may allow L2 writing researchers to broaden their understanding of cohesion development in L2 writing.

Moreover, further studies that combine automatic and manual analyses are required to analyse cohesion features in L2 writing. Additional work in this area may help to improve automated analysers aimed to measure the cohesion features suggested by Halliday and Hasan (1976). TAACO, the tool used in this study, provides different indexes (e.g., lexical, and semantical overlap, givenness, connective words) that can easily be linked to Halliday and Hasan's theory on cohesion in English. However, automatic analysers such as TAACO seem to fail at accurately identifying whether connectives precede clauses, connectives occur within clauses, or connectives occur at the end of clauses. While TAACO provides a complete inventory of connective words used by L2 writers, the automatic analyser cannot distinguish between connective words that signal cohesion within sentences. Nor the TAACO tool can distinguish the use of similar connective words (e.g., And/and, But/but, For example/for example) occurring between paragraphs and sentences. Hence, further research is needed to understand better the nature of cohesion features (e.g., connective words) occurring in larger stretches of a text as suggested by Halliday and Hasan (1976).

9.3 Concluding Remarks

In broad terms, this study aimed to determine the nature of cohesion in written texts composed by undergraduates of English in Ecuador. To reach that aim, this study adopted a corpus-based methodology combined with the TAACO natural language processing tool for measuring linguistic features related to cohesion in L2 writing. The analysed texts were graded essays and emails at the B2 level, or upper intermediate level as suggested by the CEFR standards for teaching, learning, and assessing English as a foreign language.

In addressing the main research question, which sought to determine the nature of cohesion in L2 writing, this study posed three specific research questions:

1. What types of cohesion relations occur in L2 writing at the sentence, paragraph, and whole-text levels?

2. What is the relationship between cohesion features (e.g., grammatical, and lexical) and teachers' judgements of writing quality?

3. Do expectations of cohesion by the CEFR match what is found in student writing? And what is the relationship between connectives and teachers' judgements of writing quality?

Research Questions 1 and 2 were addressed in Chapter 6, which focused on the quantitative and in-depth analyses of cohesion features in L2 writing. Quantitative outcomes allowed this study to determine the types of cohesion relations occurring at the sentence, paragraph, and whole-text levels that best predicted the teachers' judgements of writing quality. In that respect, lexical items overlapping at the paragraph level significantly correlate and predict the teachers' scores in essays and emails composed by L2 writers in Ecuador. However, although the statistical findings were based on weak correlational findings, these findings may provide some support for the conceptual premise that cohesion features occurring between paragraphs (i.e., global level) seem more relevant as features occurring within and between sentences (i.e., local level) as suggested by some researchers interested in the relationship between cohesion features and ratings of text quality (Crossley et al., 2016b; McNamara, Crossley et al., 2010; McNamara et al., 2013; McNamara, Louwerse et al., 2010).

However, despite the findings in this study that seem to support the cohesion theory described by Halliday as in the relevance of cohesion in larger text segments, more research on cohesion at the local level of texts (i.e., within sentences) could provide better insights on the nature of cohesion in L2 writing (Butler, 2003; Martin, 2001; Ngongo, 2018).

Similarly, those results are in agreement with the theory of cohesion. Mainly, lexical overlap seems to equate with the reiteration sub-category that covers a variety of ways in which one vocabulary item may be understood to reminisce the sense of an earlier item occurring in a text (e.g., Halliday & Hasan, 1976, 1985; Halliday & Matthiessen, 2013; Hasan, 1968, 1984; Hoey, 1991; Martin, 2001; Tanskanen, 2006).

In this study, L2 writing shows evidence of reiteration, that is, by repetition between paragraphs, sentences, and the entire text. Specifically, various lemma types (e.g., adjectives, nouns, verbs content words, all lemma types: content and function words) occurring in text segments were found to show a positive relationship with teachers' judgements of writing quality in essays and emails. These findings are consistent with that of Crossley et al. (2016a), who found that lexical items overlap at the local (i.e., sentence), global (i.e., paragraph), and the entire text correlated with teachers' scores of essays composed by L2 writers, for example.

However, what is curious about those findings is that while most lexical items are positively related to teachers' scores, a handful of lexical items negatively predicted the teachers' scores of essays and emails. In this study, content word lemmas overlapping at the paragraph level, for example, predicted a lowering in teachers' scores of essays and emails.

Previous research that has included automatic analysers for determining cohesion in texts suggests that word repetition between paragraphs is related to higher writing scores (e.g., Crossley & McNamara, 2011b; Foltz, 2007), while lexical items overlapping at the sentence level have been found to negatively correlate with raters' scores (e.g., Guo et al., 2013). Likewise, past studies have found that the repetition of content words between sentences negatively correlated with essay scores (Crossley & McNamara, 2012b; Malmcrona, 2020). However, the current study's findings do not support the previous research. That

is, instead of increasing the teachers' scores, content word overlap in adjacent paragraphs and in a two-paragraph span seems to decrease the teachers' scores of essays and emails by L2 writers in Ecuador.

These unexpected findings may be related to the overuse of lexical repetition items between paragraphs. Teachers may have deemed the repetition of highly frequent words as redundant. The visual analyses of texts suggest that L2 writers included common adjectives, adverbs, verbs, and nouns in a two-paragraph span of essays and adjacent paragraphs of emails.

Coincidentally, the regression findings indicate that not only essays written under less strict conditions (e.g., non-test-like situations where L2 writers were allowed to use all the time and extra online materials needed for consulting, checking, and editing writing) suggest that content words between paragraphs decrease the teachers' scores, but also handwritten emails collected from a final written test situation predicted lower teachers' scores.

However, further research should be undertaken to investigate whether content words overlapping at the paragraph level negatively predicted the teachers' scores in other L2 writing groups composing different text types (e.g., essays, emails, articles, reviews, reports) as the CEFR recommends for assessing writing performance at the B2 level.

Another important finding related to research questions 1 and 2 was the lexical overlap of adjective lemmas overlapping in a two-paragraph span, which positively predicted the teachers' scores in essays. This finding also reflects the empirical evidence on adjectives overlapping between adjacent paragraphs, which significantly correlates with teachers' higher scores (e.g., Crossley et al., 2016a, 2016b).

However, what is curious about this result is that adjectives overlapped between spans of two and three paragraphs in this study. This result corroborates the scholars' ideas on cohesive items occurring in larger stretches of a text, that is, between paragraphs rather than within or between sentences (e.g., Halliday & Hasan, 1976; Hoey, 1991).

Question three is related to connective words required for writing at the B2 level and whether connective words correlated with teachers' judgements of writing

quality. The most important findings addressing that question suggest that L2 writers made extensive use of connective words (e.g., and, but, although) required for writing at the B2 level as suggested by the CEFR standards for the teaching, learning, and assessing of writing in English as a foreign language.

The evidence on connectives in essays, for example, shows that a total of 140/243 connective items provided by TAACO were found in the essays. In addition, the findings indicate that connective words required for writing at the B2 level were found in the analysis, and other connectives to different CEFR word levels (A1, A2, B1, C1 and C2) were present in essays by L2 writers. Similarly, 87/243 connectives were found in the emails. However, only twelve connective words belonging to the B2 level were used by L2 writers in emails.

Furthermore, descriptive statistical findings suggest that L2 writers used specific connective words (and, but, although) in the collected essays and emails. In particular, the additive ‘and’ was frequently used by L2 writers in both datasets. This connective was present in most texts of both datasets. Furthermore, although the presence of ‘but’ was less frequent, the conjunctive ‘but’ was widely used in essays and emails. Finally, the connective ‘although’ was present in ninety-seven essays; however, it was only used in five emails.

Interestingly, whilst a small group of high-frequency connective words (e.g., A1 and A2) dominated the essays, the evidence shows that many other connective words from other CEFR word levels were also found.

Evidence of the presence of other connectives in essays and emails included items regarded as basic-level connectives, at the intermediate level, as well as more advanced-level items.

Moreover, in examining the relationship between teachers’ quality judgements and the average and frequency of connective variables (provided by TAACO), the results indicate that a handful of connective indexes correlated with grades.

For the essay dataset, for example, significant negative correlations included the averages of lexical subordinators, positive causal connectives, and positive logical connectives. Findings on emails included a negative correlation on the frequency of opposition connectives and a positive correlation between all causal connectives.

Furthermore, the regression outcomes indicate that the average of lexical subordinators (e.g., that, because, although) and the average of positive causal connectives (e.g., because, so, if) had a negative association with the teachers' scores, while the frequency of sentence linking connectives (e.g., for, because, as, but, although) positively predicted essay scores.

In emails, the findings showed that two correlations were significantly associated with teachers' judgements of writing quality. In particular, the frequency of opposition connectives may be related to lowering grades. In contrast, the average of all causal connectives may indicate that this variable increased the teachers' scores of emails by L2 writers. Similarly, the regression findings on connectives in emails indicated that the frequencies of opposition connectives (e.g., but, maybe, however) negatively predicted the scores, while the average of all causal connectives (e.g., because, so, make) positively predicted teachers' judgements of writing quality in emails.

In conclusion, it can be stated that the findings in this study may suggest that L2 writers at more advanced levels (e.g., B2) rely on cohesion features that go beyond the sentence level. The study outcomes specifically indicate that there is a relationship, although weak, between the teachers' judgements of writing quality and cohesion occurring mainly at the paragraph level. However, while the findings also indicate negative and positive relationships between cohesion features at the sentence and the entire level of texts, the outcomes need to be taken with caution because other aspects beyond cohesion must have been considered for grading the collected essays and emails by undergraduates learning general English in Ecuador.

Appendices

Appendix I: Rubrics for Writing at the B2 Level

B2	Content	Communicative Achievement	Organisation	Language
5	All content is relevant to the task. Target reader is fully informed.	Uses the conventions of the communicative task effectively to hold the target reader's attention and communicate straightforward and complex ideas, as appropriate.	Text is well organised and coherent, using a variety of cohesive devices and organisational patterns to generally good effect.	Uses a range of vocabulary, including less common lexis, appropriately. Uses a range of simple and complex grammatical forms with control and flexibility. Occasional errors may be present but do not impede communication.
4	*Performance shares features of Bands 3 and 5.*			
3	Minor irrelevances and/or omissions may be present. Target reader is on the whole informed.	Uses the conventions of the communicative task to hold the target reader's attention and communicate straightforward ideas.	Text is generally well organised and coherent, using a variety of linking words and cohesive devices.	Uses a range of everyday vocabulary appropriately, with occasional inappropriate use of less common lexis. Uses a range of simple and some complex grammatical forms with a good degree of control. Errors do not impede communication.
2	*Performance shares features of Bands 1 and 3.*			
1	Irrelevances and misinterpretation of task may be present. Target reader is minimally informed.	Uses the conventions of the communicative task in generally appropriate ways to communicate straightforward ideas.	Text is connected and coherent, using basic linking words and a limited number of cohesive devices.	Uses everyday vocabulary generally appropriately, while occasionally overusing certain lexis. Uses simple grammatical forms with a good degree of control. While errors are noticeable, meaning can still be determined.
0	Content is totally irrelevant. Target reader is not informed.	*Performance below Band 1.*		

Rubrics for assessing writing at the B2 level. B2 First for Schools (English Cambridge Assessment, 2020, p. 34)

Appendix II: Ethics Supporting Documents

UNIVERSITY OF EXETER

GRADUATE SCHOOL OF EDUCATION

St Luke's Campus
Heavitree Road
Exeter UK EX1 2LU

http://socialsciences.exeter.ac.uk/education/

CERTIFICATE OF ETHICAL APPROVAL

Title of Project:
Exploring Cohesion in Writing by Second Language Students of Spanish Language background.

Researcher(s) name: Jose Lema

Supervisor(s): Professor Debra Myhill
Dr Philip Durrant

This project has been approved for the period

From: 18/03/2020
To: 11/09/2020

Ethics Committee approval reference: D1920-100

Signature: Dongbo Zhang Date: 17/03/2020

(Professor Dongbo Zhang, Professor of Science and Environmental Education, Ethics Officer)

Research Information Sheet

Invitation

Dear participants (School authorities, Teachers, parents, students),

My name is Jose Lema and I am a language teacher educator from Ecuador who works at the Catholic University and ESPE University. Currently, I am PhD student at the University of Exeter, School of Education in the United Kingdom. Thank you for your time and patience in reading this invitation. I am interested in doing research on writing, and I would like to invite you to take part in a research study about the use of cohesion in compositions written by English language students in Ecuador. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Ask questions if anything you read is not clear or you would like more information. Take time to decide whether or not to take part. It is also worth mentioning that no names will be used in this research, and all the information will be kept *anonymous and confidential*.

Title of Research Study

A Corpus-Based Analysis of Cohesion in L2 Writing by Undergraduate Students in Ecuador

Details of Project

This research study attempts to determine sentence, paragraph and the entire text use of cohesion in compositions written by three groups of students. For example, the analysis of written compositions to three group of students (e.g., last year of basic education and high-school and last module of English language at the university). The data for the study consists of written compositions that were marked with higher-grades by your teachers. The written texts may include exam tasks or an important school project that required you to write in English. The graded compositions collected will be further analysed enabling me to better understand the use of cohesion and cohesive connectors such as 'and', 'but', 'because'.

The study requires only your composition, and your personal information will not be used in this study. All data provided will be stored in device with built-in encryption capabilities to protect your anonymity and with a backup held in a laptop protected by a password.

If you are interested in sharing your essay for this research project, I would need you to sign the attached consent form at the bottom of this information sheet and provide your compositions either written on paper or share by email. My email address is shown at the bottom of this information sheet.

Once the research is completed, I will send a copy of the research and any published materials that come from the analysis of your essay to your school. Finally, if you have any further questions about my research project, please feel free to contact me or my supervisor by email.

After this study is completed, the compositions that you have provided may be available for other researchers interested in studying cohesion in writing. Please cross the appropriate box below to agree that your composition can later be used by other researchers. If you do not agree then your composition will only be used for this study.

Thank you for your collaboration.
Jose Lema

Appendix III: Correlations Essays

Correlations

		Grade_ESSAY	b16adjacent_overlap_all_sent	b30adjacent_overlap_binary_fw_sent	b31adjacent_overlap_2_fw_sent	b45adjacent_overlap_binary_2_verb_sent	b60adjacent_overlap_binary_pronoun_sent	b61adjacent_overlap_2_pronoun_sent	b65adjacent_overlap_argument_sent_div	b67adjacent_overlap_2_argument_sent	b69adjacent_overlap_binary_2_argument_	c82adjacent_overlap_fw_para	c85adjacent_overlap_2_fw_para	c86adjacent_overlap_2_fw_para_div_seg	c90adjacent_overlap_binary_noun_para	c96adjacent_overlap_binary_verb_para	c97adjacent_overlap_2_verb_para	c99adjacent_overlap_binary_2_verb_para	c100adjacent_overlap_adj_para
Grade_ESSAY	Pearson	1	.135*	.167**	0.116	-0.038	.152*	.134*	0.101	0.026	0.060	0.068	-0.054	.184**	.140*	0.047	-0.080	0.003	0.053
	Sig. (2-tailed)		0.037	0.010	0.072	0.554	0.018	0.038	0.120	0.684	0.354	0.291	0.408	0.004	0.030	0.472	0.215	0.964	0.417
b16adjacent_ove	Pearson	.135*	1	.647**	.603**	.380**	.416**	.295**	.664**	.394**	.393**	.224**	.169**	.166*	.217**	0.116	.160*	0.054	0.022
rlap_all_sent	Sig. (2-tailed)	0.037		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.010	0.001	0.073	0.013	0.403	0.737
b30adjacent_ove	Pearson	.167**	.647**	1	.551**	.265**	.492**	.273**	.400**	0.120	.328**	.136*	.164*	.342**	0.125	.138*	0.071	0.116	0.083
rlap_binary_fw_s	Sig. (2-tailed)	0.010	0.000		0.000	0.000	0.000	0.000	0.000	0.063	0.000	0.035	0.011	0.000	0.053	0.033	0.273	0.074	0.199
b31adjacent_ove	Pearson	0.116	.603**	.551**	1	.321**	.339**	.440**	.362**	.275**	.427**	.424**	.231**	.159*	.141*	0.075	0.088	0.091	0.044
rlap_2_fw_sent	Sig. (2-tailed)	0.072	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.029	0.247	0.176	0.160	0.493
b45adjacent_ove	Pearson	-0.038	.380**	.265**	.321**	1	.196**	.185**	.385**	.212**	.348**	0.039	0.092	.197**	-0.008	.443**	.293**	.271**	0.056
rlap_binary_2_ve	Sig. (2-tailed)	0.554	0.000	0.000	0.000		0.002	0.004	0.000	0.001	0.000	0.551	0.153	0.002	0.907	0.000	0.000	0.000	0.387
b60adjacent_ove	Pearson	.152*	.416**	.492**	.339**	.196**	1	.710**	.551**	.375**	.461**	0.124	.136*	.283**	0.063	.158*	0.122	.139*	.190**
rlap_binary_pron	Sig. (2-tailed)	0.018	0.000	0.000	0.000	0.002		0.000	0.000	0.000	0.000	0.055	0.035	0.000	0.330	0.014	0.060	0.032	0.003
b61adjacent_ove	Pearson	.134*	.295**	.273**	.440**	.185**	.710**	1	.389**	.476**	.411**	.204**	0.082	.189**	0.045	.175**	.157*	.170**	0.097
rlap_2_pronoun_	Sig. (2-tailed)	0.038	0.000	0.000	0.000	0.004	0.000		0.000	0.000	0.000	0.001	0.203	0.003	0.486	0.006	0.015	0.008	0.132
b65adjacent_ove	Pearson	0.101	.664**	.400**	.362**	.385**	.551**	.389**	1	.628**	.642**	.136*	.155*	.144*	.272**	0.103	.158*	0.060	0.106
rlap_argument_s	Sig. (2-tailed)	0.120	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.035	0.016	0.025	0.000	0.113	0.014	0.359	0.101
b67adjacent_ove	Pearson	0.026	.394**	0.120	.275**	.212**	.375**	.476**	.628**	1	.714**	.139*	0.102	0.084	.350**	.149*	.207**	.129*	0.104
rlap_2_argument	Sig. (2-tailed)	0.684	0.000	0.063	0.000	0.001	0.000	0.000	0.000		0.000	0.031	0.114	0.193	0.000	0.021	0.001	0.045	0.108
b69adjacent_ove	Pearson	0.060	.393**	.328**	.427**	.348**	.461**	.411**	.642**	.714**	1	.158*	.197**	.150*	.281**	.148*	.157*	.140*	0.124
rlap_binary_2_ar	Sig. (2-tailed)	0.354	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.014	0.002	0.020	0.000	0.021	0.015	0.030	0.055
c82adjacent_over	Pearson	0.068	.224**	.136*	.424**	0.039	0.124	.204**	.136*	.139*	.158*	1	.597**	.251**	.140*	0.115	.259**	0.074	0.108
lap_fw_para	Sig. (2-tailed)	0.291	0.000	0.035	0.000	0.551	0.055	0.001	0.035	0.031	0.014		0.000	0.000	0.030	0.075	0.000	0.252	0.094
c85adjacent_over	Pearson	-0.054	.169**	.164*	.231**	0.092	.136*	0.082	.155*	0.102	.197**	.597**	1	.319**	0.073	.152*	.223**	0.019	0.045
lap_2_fw_para	Sig. (2-tailed)	0.408	0.009	0.011	0.000	0.153	0.035	0.203	0.016	0.114	0.002	0.000		0.000	0.259	0.018	0.000	0.769	0.489
c86adjacent_over	Pearson	.184**	.166*	.342**	.159*	.197**	.283**	.189**	.144*	0.084	.150*	.251**	.319**	1	0.119	.325**	.162*	.342**	.172**
lap_2_fw_para_d	Sig. (2-tailed)	0.004	0.010	0.000	0.014	0.002	0.000	0.003	0.025	0.193	0.020	0.000	0.000		0.065	0.000	0.012	0.000	0.008
c90adjacent_over	Pearson	.140*	.217**	0.125	.141*	-0.008	0.063	0.045	.272**	.350**	.281**	.140*	0.073	0.119	1	0.090	0.064	0.012	0.095
lap_binary_noun	Sig. (2-tailed)	0.030	0.001	0.053	0.029	0.907	0.330	0.486	0.000	0.000	0.000	0.030	0.259	0.065		0.164	0.325	0.850	0.140
c96adjacent_over	Pearson	0.047	0.116	.138*	0.075	.443**	.158*	.175**	0.103	.149*	.148*	0.115	.152*	.325**	0.090	1	.473**	.604**	.146*
lap_binary_verb_	Sig. (2-tailed)	0.472	0.073	0.033	0.247	0.000	0.014	0.006	0.113	0.021	0.021	0.075	0.018	0.000	0.164		0.000	0.000	0.023
c97adjacent_over	Pearson	-0.080	.160*	0.071	0.088	.293**	0.122	.157*	.158*	.207**	.157*	.259**	.223**	.162*	0.064	.473**	1	.519**	0.116
lap_2_verb_para	Sig. (2-tailed)	0.215	0.013	0.273	0.176	0.000	0.060	0.015	0.014	0.001	0.015	0.000	0.000	0.012	0.325	0.000		0.000	0.073
c99adjacent_over	Pearson	0.003	0.054	0.116	0.091	.271**	.139*	.170**	0.060	.129*	.140*	0.074	0.019	.342**	0.012	.604**	.519**	1	0.046
lap_binary_2_ver	Sig. (2-tailed)	0.964	0.403	0.074	0.160	0.000	0.032	0.008	0.359	0.045	0.030	0.252	0.769	0.000	0.850	0.000	0.000		0.477
c100adjacent_ov	Pearson	0.053	0.022	0.083	0.044	0.056	.190**	0.097	0.106	0.104	0.124	0.108	0.045	.172**	0.095	.146*	0.116	0.046	1
erlap_adj_para	Sig. (2-tailed)	0.417	0.737	0.199	0.493	0.387	0.003	0.132	0.101	0.108	0.055	0.094	0.489	0.008	0.140	0.023	0.073	0.477	

Correlations

		Grade ESSAY	c104adjacent_overlap_2_adj_para_div_seg	c105adjacent_overlap_binary_2_adj_para	c107adjacent_overlap_adv_para_div_seg	c111adjacent_overlap_binary_2_adv_para	c112adjacent_overlap_pronoun_para	c115adjacent_overlap_2_pronoun_para	c117adjacent_overlap_binary_2_pronoun_para	c118adjacent_overlap_argument_para	c122adjacent_overlap_2_argument_para_div_seg	d125syn_overlap_sent_verb	d126syn_overlap_para_noun	d127syn_overlap_para_verb	d130lsa_1_all_para	e168repeated_content_and_pronoun_lemmas	b26adjacent_overlap_2_cw_sent_div_seg
Grade_ESSAY	Pearson	1	.198**	.178**	0.019	0.006	.177**	0.006	0.024	0.110	.130*	0.102	.165*	.178**	0.063	-0.072	-0.054
	Sig. (2-tailed)		0.002	0.006	0.772	0.926	0.006	0.929	0.708	0.090	0.045	0.115	0.011	0.006	0.328	0.269	0.408
c104adjacent_overlap_2_adj_para_div_seg	Pearson	.198**	1	.842**	0.109	.202**	0.040	.150*	.196**	-0.015	.205**	0.043	0.107	.192**	-0.020	.154*	-0.008
	Sig. (2-tailed)	0.002		0.000	0.092	0.002	0.532	0.020	0.002	0.821	0.001	0.512	0.099	0.003	0.762	0.017	0.898
c105adjacent_overlap_binary_2_adj_para	Pearson	.178**	.842**	1	0.107	.205**	0.093	.181**	.311**	0.010	.251**	0.067	0.106	.237**	-0.021	.143*	0.008
	Sig. (2-tailed)	0.006	0.000		0.099	0.001	0.152	0.005	0.000	0.880	0.000	0.299	0.102	0.000	0.743	0.027	0.899
c107adjacent_overlap_adv_para_div_seg	Pearson	0.019	0.109	0.107	1	.702**	.183**	0.065	0.091	.185**	.314**	0.082	.175**	.272**	.190**	.289**	.132*
	Sig. (2-tailed)	0.772	0.092	0.099		0.000	0.004	0.318	0.159	0.004	0.000	0.206	0.007	0.000	0.003	0.000	0.040
c111adjacent_overlap_binary_2_adv_para	Pearson	0.006	.202**	.205**	.702**	1	0.115	0.096	.191**	.138*	.310**	0.047	.166**	.191**	.191**	.339**	0.113
	Sig. (2-tailed)	0.926	0.002	0.001	0.000		0.076	0.136	0.003	0.033	0.000	0.472	0.010	0.003	0.003	0.000	0.080
c112adjacent_overlap_pronoun_para	Pearson	.177**	0.040	0.093	.183**	0.115	1	.503**	.350**	.441**	.260**	.138*	0.042	.336**	0.011	0.124	-0.013
	Sig. (2-tailed)	0.006	0.532	0.152	0.004	0.076		0.000	0.000	0.000	0.000	0.032	0.517	0.000	0.864	0.055	0.841
c115adjacent_overlap_2_pronoun_para	Pearson	0.006	.150*	.181**	0.065	0.096	.503**	1	.649**	.248**	.326**	.176**	0.025	.231**	-0.011	.186**	0.067
	Sig. (2-tailed)	0.929	0.020	0.005	0.318	0.136	0.000		0.000	0.000	0.000	0.006	0.696	0.000	0.869	0.004	0.303
c117adjacent_overlap_binary_2_pronoun_para	Pearson	0.024	.196**	.311**	0.091	.191**	.350**	.649**	1	.169**	.400**	.159*	0.044	.231**	-0.002	0.112	0.056
	Sig. (2-tailed)	0.708	0.002	0.000	0.159	0.003	0.000	0.000		0.009	0.000	0.014	0.501	0.000	0.978	0.082	0.384
c118adjacent_overlap_argument_para	Pearson	0.110	-0.015	0.010	.185**	.138*	.441**	.248**	.169**	1	.480**	0.024	.532**	.219**	.496**	.443**	.233**
	Sig. (2-tailed)	0.090	0.821	0.880	0.004	0.033	0.000	0.000	0.009		0.000	0.712	0.000	0.001	0.000	0.000	0.000
c122adjacent_overlap_2_argument_para_div_seg	Pearson	.130*	.205**	.251**	.314**	.310**	.260**	.326**	.400**	.480**	1	0.066	.628**	.409**	.323**	.408**	0.107
	Sig. (2-tailed)	0.045	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.312	0.000	0.000	0.000	0.000	0.097
d125syn_overlap_sent_verb	Pearson	0.102	0.043	0.067	0.082	0.047	.138*	.176**	.159*	0.024	0.066	1	-0.017	.400**	-0.006	.147*	.483**
	Sig. (2-tailed)	0.115	0.512	0.299	0.206	0.472	0.032	0.006	0.014	0.712	0.312		0.791	0.000	0.926	0.023	0.000
d126syn_overlap_para_noun	Pearson	.165*	0.107	0.106	.175**	.166**	0.042	0.025	0.044	.532**	.628**	-0.017	1	.335**	.574**	.401**	.216**
	Sig. (2-tailed)	0.011	0.099	0.102	0.007	0.010	0.517	0.696	0.501	0.000	0.000	0.791		0.000	0.000	0.000	0.001
d127syn_overlap_para_verb	Pearson	.178**	.192**	.237**	.272**	.191**	.336**	.231**	.231**	.219**	.409**	.400**	.335**	1	.161*	.331**	0.118
	Sig. (2-tailed)	0.006	0.003	0.000	0.000	0.003	0.000	0.000	0.000	0.001	0.000	0.000	0.000		0.012	0.000	0.069
d130lsa_1_all_para	Pearson	0.063	-0.020	-0.021	.190**	.191**	0.011	-0.011	-0.002	.496**	.323**	-0.006	.574**	.161*	1	.425**	.232**
	Sig. (2-tailed)	0.328	0.762	0.743	0.003	0.003	0.864	0.869	0.978	0.000	0.000	0.926	0.000	0.012		0.000	0.000
e168repeated_content_and_pronoun_lemmas	Pearson	-0.072	.154*	.143*	.289**	.339**	0.124	.186**	0.112	.443**	.408**	.147*	.401**	.331**	.425**	1	.348**
	Sig. (2-tailed)	0.269	0.017	0.027	0.000	0.000	0.055	0.004	0.082	0.000	0.000	0.023	0.000	0.000	0.000		0.000
b26adjacent_overlap_2_cw_sent_div_seg	Pearson	-0.054	-0.008	0.008	.132*	0.113	-0.013	0.067	0.056	.233**	0.107	.483**	.216**	0.118	.232**	.348**	1
	Sig. (2-tailed)	0.408	0.898	0.899	0.040	0.080	0.841	0.303	0.384	0.000	0.097	0.000	0.001	0.069	0.000	0.000	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix IV: Correlations Emails

Correlations

		Grade EMAIL	24	32	39	78	81	87	90	91	94	96	97	98	101	105	114	115	118	124	125	126	127	130
Grade_EMAIL	Pearson	1	0.090	0.056	.147*	.135*	0.074	-0.041	.252**	.175**	0.114	.237**	-0.003	0.086	0.030	0.118	.193**	0.022	0.071	0.113	-0.022	.246**	.147*	.194**
	Sig. (2-tailed)		0.163	0.389	0.022	0.037	0.255	0.527	0.000	0.007	0.079	0.000	0.963	0.186	0.647	0.069	0.003	0.735	0.271	0.080	0.734	0.000	0.023	0.003
b24adjacent_overlap_binary_cw_sent	Pearson	0.090	1	.497**	.662**	.235**	0.054	-0.022	.343**	.237**	.310**	.240**	.192**	.146*	.143*	.180**	0.052	0.062	0.090	.662**	.570**	.365**	.214**	.177**
	Sig. (2-tailed)	0.163		0.000	0.000	0.000	0.404	0.735	0.000	0.000	0.000	0.000	0.003	0.024	0.027	0.005	0.421	0.335	0.163	0.000	0.000	0.000	0.001	0.006
b32adjacent_overlap_2_fw_sent_div_seg	Pearson	0.056	.497**	1	.399**	.237**	0.103	0.070	.212**	0.084	.200**	.263**	.149*	0.117	.139*	0.098	.158*	0.052	0.083	.385**	.465**	.191**	0.098	.190**
	Sig. (2-tailed)	0.389	0.000		0.000	0.000	0.113	0.278	0.001	0.193	0.002	0.000	0.021	0.071	0.032	0.129	0.014	0.426	0.202	0.000	0.000	0.003	0.132	0.003
b39adjacent_overlap_binary_2_noun_sent	Pearson	.147*	.662**	.399**	1	0.126	0.101	0.011	.375**	.401**	.236**	0.123	.245**	0.125	.148*	.169**	0.123	0.121	.167**	.796**	.289**	.397**	0.048	0.037
	Sig. (2-tailed)	0.022	0.000	0.000		0.052	0.117	0.870	0.000	0.000	0.000	0.057	0.000	0.053	0.022	0.009	0.056	0.062	0.010	0.000	0.000	0.000	0.458	0.564
c78adjacent_overlap_binary_cw_para	Pearson	.135*	.235**	.237**	0.126	1	.366**	0.104	.629**	.245**	.439**	.741**	.300**	.293**	.335**	.228**	.527**	0.089	.315**	.149*	0.118	.439**	.356**	.411**
	Sig. (2-tailed)	0.037	0.000	0.000	0.052		0.000	0.107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.021	0.067	0.000	0.000	0.000
c81adjacent_overlap_binary_2_cw_para	Pearson	0.074	0.054	0.103	0.101	.366**	1	.663**	0.108	.382**	0.088	.215**	.343**	.480**	0.033	.269**	.301**	.492**	0.100	0.070	0.048	0.051	0.030	.203**
	Sig. (2-tailed)	0.255	0.404	0.113	0.117	0.000		0.000	0.094	0.000	0.176	0.001	0.000	0.000	0.608	0.000	0.000	0.000	0.124	0.280	0.459	0.434	0.640	0.002
c87adjacent_overlap_binary_2_fw_para	Pearson	-0.041	-0.022	0.070	0.011	0.104	.663**	1	-0.090	.219**	0.038	0.054	.146*	.328**	-0.083	.127*	.289**	.481**	0.099	0.010	-0.011	-0.106	-0.120	0.071
	Sig. (2-tailed)	0.527	0.735	0.278	0.870	0.107	0.000		0.167	0.001	0.555	0.401	0.024	0.000	0.198	0.049	0.000	0.000	0.126	0.882	0.862	0.102	0.063	0.276
c90adjacent_overlap_binary_noun_para	Pearson	.252**	.343**	.212**	.375**	.629**	0.108	-0.090	1	.471**	.387**	.484**	.191**	.179**	.306**	.162*	.411**	-0.010	.408**	.327**	.131*	.701**	.342**	.424**
	Sig. (2-tailed)	0.000	0.000	0.001	0.000	0.000	0.094	0.167		0.000	0.000	0.000	0.003	0.006	0.000	0.012	0.000	0.879	0.000	0.000	0.043	0.000	0.000	0.000
c91adjacent_overlap_2_noun_para	Pearson	.175**	.237**	0.084	.401**	.245**	.382**	.219**	.471**	1	.329**	.251**	.422**	.310**	.219**	.304**	.133*	.392**	.478**	.326**	0.101	.542**	0.100	.187**
	Sig. (2-tailed)	0.007	0.000	0.193	0.000	0.000	0.000	0.001	0.000		0.000	0.000	0.000	0.000	0.001	0.000	0.040	0.000	0.000	0.000	0.118	0.000	0.123	0.004
c94adjacent_overlap_verb_para	Pearson	0.114	.310**	.200**	.236**	.439**	0.088	0.038	.387**	.329**	1	.624**	.670**	.547**	.239**	.179**	.169**	.145*	.348**	.247**	.255**	.417**	.527**	.254**
	Sig. (2-tailed)	0.079	0.000	0.002	0.000	0.000	0.176	0.555	0.000	0.000		0.000	0.000	0.000	0.000	0.005	0.009	0.025	0.000	0.000	0.000	0.000	0.000	0.000
c96adjacent_overlap_binary_verb_para	Pearson	.237**	.240**	.263**	0.123	.741**	.215**	0.054	.484**	.251**	.624**	1	.372**	.410**	.306**	.164*	.487**	0.119	.365**	.158*	.212**	.422**	.499**	.410**
	Sig. (2-tailed)	0.000	0.000	0.000	0.057	0.000	0.001	0.401	0.000	0.000	0.000		0.000	0.000	0.000	0.011	0.000	0.065	0.000	0.014	0.001	0.000	0.000	0.000
c97adjacent_overlap_2_verb_para	Pearson	-0.003	.192**	.149*	.245**	.300**	.343**	.146*	.191**	.422**	.670**	.372**	1	.736**	.201**	.283**	0.119	.387**	.138*	.232**	.159*	.234**	.320**	.134*
	Sig. (2-tailed)	0.963	0.003	0.021	0.000	0.000	0.000	0.024	0.003	0.000	0.000	0.000		0.000	0.002	0.000	0.067	0.000	0.032	0.000	0.014	0.000	0.000	0.038
c98adjacent_overlap_2_verb_para_div_seg	Pearson	0.086	.146*	0.117	0.125	.293**	.480**	.328**	.179**	.310**	.547**	.410**	.736**	1	0.098	.290**	.207**	.376**	0.116	0.120	.220**	.241**	.496**	.287**
	Sig. (2-tailed)	0.186	0.024	0.071	0.053	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000		0.129	0.000	0.001	0.000	0.073	0.063	0.001	0.000	0.000	0.000
c101adjacent_overlap_adj_para_div_seg	Pearson	0.030	.143*	.139*	.148*	.335**	0.033	-0.083	.306**	.219**	.239**	.306**	.201**	0.098	1	.602**	.136*	-0.028	.151*	0.122	0.026	.473**	.154*	.262**
	Sig. (2-tailed)	0.647	0.027	0.032	0.022	0.000	0.608	0.198	0.000	0.001	0.000	0.000	0.002	0.129		0.000	0.036	0.664	0.020	0.060	0.687	0.000	0.017	0.000
c105adjacent_overlap_binary_2_adj_para	Pearson	0.118	.180**	0.098	.169**	.228**	.269**	.127*	.162*	.304**	.179**	.164*	.283**	.290**	.602**	1	0.076	.203**	0.043	.171**	0.086	.328**	.128*	.230**
	Sig. (2-tailed)	0.069	0.005	0.129	0.009	0.000	0.000	0.049	0.012	0.000	0.005	0.011	0.000	0.000	0.000		0.238	0.002	0.509	0.008	0.184	0.000	0.048	0.000
c114adjacent_overlap_binary_pronoun_para	Pearson	.193**	0.052	.158*	0.123	.527**	.301**	.289**	.411**	.133*	.169**	.487**	0.119	.207**	.136*	0.076	1	.169**	.436**	.154*	-0.052	.274**	.158*	.359**
	Sig. (2-tailed)	0.003	0.421	0.014	0.056	0.000	0.000	0.000	0.000	0.040	0.009	0.000	0.067	0.001	0.036	0.238		0.009	0.000	0.017	0.426	0.000	0.014	0.000
c115adjacent_overlap_2_pronoun_para	Pearson	0.022	0.062	0.052	0.121	0.089	.492**	.481**	-0.010	.392**	.145*	0.119	.387**	.376**	-0.028	.203**	.169**	1	.296**	0.099	0.025	0.047	-0.024	0.056
	Sig. (2-tailed)	0.735	0.335	0.426	0.062	0.172	0.000	0.000	0.879	0.000	0.025	0.065	0.000	0.000	0.664	0.002	0.009		0.000	0.127	0.696	0.467	0.708	0.389
c118adjacent_overlap_argument_para	Pearson	0.071	0.090	0.083	.167**	.315**	0.100	0.099	.408**	.478**	.348**	.365**	.138*	0.116	.151*	0.043	.436**	.296**	1	.144*	0.044	.411**	.246**	.389**
	Sig. (2-tailed)	0.271	0.163	0.202	0.010	0.000	0.124	0.126	0.000	0.000	0.000	0.000	0.032	0.073	0.020	0.509	0.000	0.000		0.026	0.495	0.000	0.000	0.000
d124syn_overlap_sent_noun	Pearson	0.113	.662**	.385**	.796**	.149*	0.070	0.010	.327**	.326**	.247**	.158*	.232**	0.120	0.122	.171**	.154*	0.099	.144*	1	.244**	.358**	0.099	0.065
	Sig. (2-tailed)	0.080	0.000	0.000	0.000	0.021	0.280	0.882	0.000	0.000	0.000	0.014	0.000	0.063	0.060	0.008	0.017	0.127	0.026		0.000	0.000	0.124	0.315
d125syn_overlap_sent_verb	Pearson	-0.022	.570**	.465**	.289**	0.118	0.048	-0.011	.131*	0.101	.255**	.212**	.159*	.220**	0.026	0.086	-0.052	0.025	0.044	.244**	1	.187**	.392**	.250**
	Sig. (2-tailed)	0.734	0.000	0.000	0.000	0.067	0.459	0.862	0.043	0.118	0.000	0.001	0.014	0.001	0.687	0.184	0.426	0.696	0.495	0.000		0.004	0.000	0.000
d126syn_overlap_para_noun	Pearson	.246**	.365**	.191**	.397**	.439**	0.051	-0.106	.701**	.542**	.417**	.422**	.234**	.241**	.473**	.328**	.274**	0.047	.411**	.358**	.187**	1	.419**	.351**
	Sig. (2-tailed)	0.000	0.000	0.003	0.000	0.000	0.434	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.467	0.000	0.000	0.004		0.000	0.000
d127syn_overlap_para_verb	Pearson	.147*	.214**	0.098	0.048	.356**	0.030	-0.120	.342**	0.100	.527**	.499**	.320**	.496**	.154*	.128*	.158*	-0.024	.246**	0.099	.392**	.419**	1	.476**
	Sig. (2-tailed)	0.023	0.001	0.132	0.458	0.000	0.640	0.063	0.000	0.123	0.000	0.000	0.000	0.000	0.017	0.048	0.014	0.708	0.000	0.124	0.000	0.000		0.000
d130lsa_1_all_para	Pearson	.194**	.177**	.190**	0.037	.411**	.203**	0.071	.424**	.187**	.254**	.410**	.134*	.287**	.262**	.230**	.359**	0.056	.389**	0.065	.250**	.351**	.476**	1
	Sig. (2-tailed)	0.003	0.006	0.003	0.564	0.000	0.002	0.276	0.000	0.004	0.000	0.000	0.038	0.000	0.000	0.000	0.000	0.389	0.000	0.315	0.000	0.000	0.000	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix V: Connectives Found in Essays

Connective	CEFR Level	Frequency	Normed Frequency 10K	Percentage Cumulative Frequency	Number of texts	% of All Connectives
the	A1	5781	1135	43	240	43.27
and	A1	1767	347	57	239	13.23
a	A1	792	155	62	219	5.93
that	A1	747	147	68	222	5.59
for	A1	528	104	72	203	3.95
because	A1	371	73	75	178	2.78
as	A1	319	63	77	151	2.39
also	A1	266	52	79	141	1.99
or	A1	235	46	81	137	1.76
this	A1	218	43	83	128	1.63
but	A1	184	36	84	129	1.38
although	B1	134	26	85	97	1.00
when	B2	134	26	86	91	1.00
by	A2	114	22	87	86	0.85
even	B2	104	20	88	84	0.78
so	A2	104	20	88	76	0.78
make	B1	102	20	89	81	0.76
for example	A1	100	20	90	80	0.75
these	A1	87	17	90	70	0.65
if	A2	83	16	91	64	0.62
an	A1	80	16	92	114	0.60
though	B2	71	14	92	53	0.53
such as	A2	61	12	93	52	0.46
another	A2	60	12	93	48	0.45
only	A1	47	9	93	37	0.35
in conclusion	B2	47	9	94	47	0.35
makes	B1	42	8	94	36	0.31
too	A1	42	8	94	34	0.31
since	B1	36	7	95	29	0.27
however	A2	30	6	95	26	0.22
that is	C1	30	6	95	27	0.22
want	A1	27	5	95	22	0.20
before	A2	25	5	96	22	0.19
those	A1	24	5	96	20	0.18
first	A1	24	5	96	20	0.18
due to	B1	21	4	96	21	0.16
made	A1	21	4	96	19	0.16
because of	A1	20	4	96	18	0.15
cause	B2	20	4	97	16	0.15
making	A1	20	4	97	20	0.15
causes	B2	18	4	97	18	0.13
finally	A2	17	3	97	17	0.13
while	A2	16	3	97	16	0.12
despite	B1	15	3	97	13	0.11
until	B1	13	3	97	11	0.10

Connective	CEFR Level	Frequency	Normed Frequency 10K	Percentage Cumulative Frequency	Number of texts	% of All Connectives
as well	A1	12	2	97	9	0.09
on the other hand	B2	12	2	97	12	0.09
besides	B1	12	2	98	12	0.09
instead	A2	12	2	98	12	0.09
therefore	B1	12	2	98	11	0.09
soon	A1	10	2	98	9	0.07
actually	A2	10	2	98	10	0.07
thus	B2	10	2	98	9	0.07
in addition	B1	9	2	98	8	0.07
consequences	B2	9	2	98	8	0.07
result	B1	8	2	98	8	0.06
after	B1	8	2	98	7	0.06
in order to	B1	8	2	98	8	0.06
caused	B2	8	2	98	8	0.06
then	A1	8	2	98	7	0.06
second	A1	8	2	98	8	0.06
provided	B1	7	1	99	7	0.05
purpose	B1	7	1	99	6	0.05
following	A2	7	1	99	7	0.05
causing	B2	7	1	99	5	0.05
results	B1	6	1	99	6	0.04
instantly	B2	6	1	99	5	0.04
at the same time	B1	6	1	99	6	0.04
immediately	A2	6	1	99	6	0.04
still	A2	6	1	99	6	0.04
purposes	B1	5	1	99	5	0.04
enables	B2	5	1	99	5	0.04
previously	B1	5	1	99	5	0.04
rather	B1	5	1	99	5	0.04
wherever	B1	5	1	99	5	0.04
so that	B1	5	1	99	5	0.04
in case	B1	4	1	99	4	0.03
arises	C1	4	1	99	4	0.03
conditions	B1	4	1	99	4	0.03
desires	B2	4	1	99	4	0.03
once	A2	4	1	99	3	0.03
enable	B2	4	1	99	3	0.03
in fact	B1	3	1	99	3	0.02
at least	A2	3	1	99	3	0.02
now that	B2	3	1	99	3	0.02
moreover	B2	3	1	99	2	0.02
simultaneously	B2	3	1	99	2	0.02
for that reason	A2	3	1	99	2	0.02
follow	A2	2	0	99	2	0.01
wants	A1	2	0	99	2	0.01

Connective	CEFR Level	Frequency	Normed Frequency 10K	Percentage Cumulative Frequency	Number of texts	% of All Connectives
as a result	B2	2	0	99	2	0.01
at last	B1	2	0	100	2	0.01
in short	C1	2	0	100	2	0.01
again	A1	2	0	100	2	0.01
this time	A2	2	0	100	2	0.01
to return to	B2	2	0	100	2	0.01
enabled	B2	2	0	100	2	0.01
further	A2	2	0	100	2	0.01
furthermore	B2	2	0	100	2	0.01
goal	A2	2	0	100	2	0.01
nevertheless	B2	2	0	100	2	0.01
next	A1	2	0	100	2	0.01
otherwise	B1	2	0	100	2	0.01
throughout	B2	2	0	100	2	0.01
yet	A2	2	0	100	2	0.01
for instance	B1	2	0	100	2	0.01
maybe	A2	2	0	100	2	0.01
apart from	B1	2	0	100	2	0.01
above all	B1	2	0	100	2	0.01
that is why	B1	2	0	100	2	0.01
wanting	A1	1	0	100	1	0.01
in order that	B1	1	0	100	1	0.01
at this moment	A2	1	0	100	1	0.01
in any case	B2	1	0	100	1	0.01
in other words	B2	1	0	100	1	0.01
in sum	B2	1	0	100	1	0.01
on one hand	B2	1	0	100	1	0.01
on the contrary	B2	1	0	100	1	0.01
on the one hand	B2	1	0	100	1	0.01
provided that	B2	1	0	100	1	0.01
to conclude	C1	1	0	100	1	0.01
arise	C1	1	0	100	1	0.01
consequence	B2	1	0	100	1	0.01
desired	C1	1	0	100	1	0.01
firstly	B2	1	0	100	1	0.01
goals	A2	1	0	100	1	0.01
hence	C1	1	0	100	1	0.01
likewise	C2	1	0	100	1	0.01
nor	B2	1	0	100	1	0.01
secondly	B2	1	0	100	1	0.01
similarly	C1	1	0	100	1	0.01
summarizing	C1	1	0	100	1	0.01
unless	B1	1	0	100	1	0.01
upon	B1	1	0	100	1	0.01
till	B1	1	0	100	1	0.01
whenever	B1	1	0	100	1	0.01
whatever	B1	1	0	100	1	0.01
so far	B1	1	0	100	1	0.01
perhaps	A2	1	0	100	1	0.01
in spite of	B1	1	0	100	1	0.01
only if	B2	1	0	100	1	0.01

Appendix VI: Correlations Connectives Essays

Correlations

		Grade_ESSAY	e149all_causal	e158positive_logical	e150positive_causal	e146sentence linking_Frequency	e157all_logical	e143lexical subordinators	e148reason_ and_purpose
Grade_ESSAY	Pearson Correlation	1	-0.125	-.131*	-.147*	0.069	-0.087	-.148*	-0.021
	Sig. (2-tailed)		0.053	0.043	0.023	0.286	0.180	0.022	0.749
e149all_causal	Pearson Correlation	-0.125	1	.638**	.749**	.456**	.611**	.533**	.428**
	Sig. (2-tailed)	0.053		0.000	0.000	0.000	0.000	0.000	0.000
e158positive_logical	Pearson Correlation	-.131*	.638**	1	.598**	.511**	.662**	.486**	.527**
	Sig. (2-tailed)	0.043	0.000		0.000	0.000	0.000	0.000	0.000
e150positive_causal	Pearson Correlation	-.147*	.749**	.598**	1	.471**	.494**	.444**	.414**
	Sig. (2-tailed)	0.023	0.000	0.000		0.000	0.000	0.000	0.000
e146sentence_linking_Frequency	Pearson Correlation	0.069	.456**	.511**	.471**	1	.475**	.520**	.680**
	Sig. (2-tailed)	0.286	0.000	0.000	0.000		0.000	0.000	0.000
e157all_logical	Pearson Correlation	-0.087	.611**	.662**	.494**	.475**	1	.358**	.285**
	Sig. (2-tailed)	0.180	0.000	0.000	0.000	0.000		0.000	0.000
e143lexical_subordinators	Pearson Correlation	-.148*	.533**	.486**	.444**	.520**	.358**	1	.497**
	Sig. (2-tailed)	0.022	0.000	0.000	0.000	0.000	0.000		0.000
e148reason_and_purpose	Pearson Correlation	-0.021	.428**	.527**	.414**	.680**	.285**	.497**	1
	Sig. (2-tailed)	0.749	0.000	0.000	0.000	0.000	0.000	0.000	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix VII: Connectives Found in Emails

Connective	CEFR Level	Frequency	Normed Frequency 10K	Percentage Cumulative Frequency	Number of texts	% of All Connectives
the	A1	1754	418	22	239	21.61
and	A1	1127	269	35	235	13.89
a	A1	864	206	46	230	10.65
that	A1	661	158	54	207	8.14
for	A1	515	123	61	206	6.35
this	A1	347	83	65	163	4.28
because	A1	346	83	69	181	4.26
but	A1	288	69	73	150	3.55
if	A2	266	63	76	144	3.28
so	A2	189	45	78	105	2.33
want	A1	168	40	80	109	2.07
or	A1	160	38	82	97	1.97
when	B2	111	26	84	83	1.37
also	A1	101	24	85	74	1.24
as	A1	87	21	86	59	1.07
soon	A1	84	20	87	72	1.03
by	A2	69	16	88	56	0.85
first	A1	64	15	89	61	0.79
an	A1	62	15	89	57	0.76
next	A1	49	12	90	44	0.60
maybe	A2	47	11	91	39	0.58
after	B1	45	11	91	37	0.55
finally	A2	43	10	92	40	0.53
too	A1	40	10	92	35	0.49
another	A2	39	9	93	35	0.48
only	A1	34	8	93	31	0.42
for example	A1	34	8	94	29	0.42
make	B1	33	8	94	28	0.41
then	A1	31	7	94	26	0.38
that is	C1	29	7	95	25	0.36
such as	A2	27	6	95	27	0.33
these	A1	24	6	95	23	0.30
second	A1	19	5	96	19	0.23
however	A2	18	4	96	18	0.22
since	B1	18	4	96	16	0.22
while	A2	17	4	96	17	0.21
again	A1	16	4	96	16	0.20
before	A2	16	4	97	15	0.20
anyway	A2	15	4	97	14	0.18
those	A1	14	3	97	12	0.17
by the way	A2	14	3	97	14	0.17
wanted	A1	12	3	97	11	0.15

Connective	CEFR Level	Frequency	Normed Frequency 10K	Percentage Cumulative Frequency	Number of texts	% of All Connectives
the last time	B2	12	3	97	12	0.15
made	A1	11	3	98	10	0.14
actually	A2	10	2	98	9	0.12
until	B1	10	2	98	9	0.12
yet	A2	9	2	98	8	0.11
even	B2	7	2	98	6	0.09
once	A2	7	2	98	7	0.09
this time	A2	7	2	98	7	0.09
in order	B1	7	2	98	6	0.09
so far	B1	7	2	98	7	0.09
despite	B1	6	1	98	6	0.07
firstly	B2	6	1	99	6	0.07
fortunately	B1	6	1	99	6	0.07
later	A1	6	1	99	6	0.07
makes	B1	6	1	99	4	0.07
on the other hand	B2	5	1	99	5	0.06
for this reason	C1	5	1	99	5	0.06
although	B1	5	1	99	5	0.06
perhaps	A2	5	1	99	5	0.06
still	A2	5	1	99	5	0.06
whenever	B1	5	1	99	5	0.06
for that reason	A2	5	1	99	5	0.06
in actual fact	B2	5	1	99	5	0.06
in addition	B1	5	1	99	5	0.06
now that	B2	5	1	99	5	0.06
so that	B1	5	1	99	5	0.06
suddenly	B1	4	1	99	4	0.05
wants	A1	4	1	100	4	0.05
whatever	B1	4	1	100	4	0.05
wherever	B1	4	1	100	4	0.05
cause	B2	3	1	100	3	0.04
at the same time	B1	3	1	100	3	0.04
because of	A1	3	1	100	3	0.04
in case	B1	3	1	100	3	0.04
in fact	B1	3	1	100	3	0.04
once again	B1	3	1	100	3	0.04
above all	B1	2	0	100	2	0.02
at least	A2	2	0	100	2	0.02
for instance	B1	2	0	100	2	0.02
provided that	B2	2	0	100	2	0.02
at this moment	A2	1	0	100	1	0.01
in any case	B2	1	0	100	1	0.01
in other words	B2	1	0	100	1	0.01
in spite of	B1	1	0	100	1	0.01
only if	B2	1	0	100	1	0.01

Appendix VIII: Correlations Connectives Emails

Correlations

		Grade_EMAIL	e159_FREQ_negative_logical	e151_FREQ_opposition	e146_FREQ_sentence_linking	e146sentence linking
Grade_EMAIL	Pearson Correlation	1	-.139*	-.139*	0.027	-0.028
	Sig. (2-tailed)		0.031	0.031	0.682	0.670
	N	240	240	240	240	240
e159_FREQ_negative_logical	Pearson Correlation	-.139*	1	.912**	.566**	.533**
	Sig. (2-tailed)	0.031		0.000	0.000	0.000
	N	240	240	240	240	240
e151_FREQ_opposition	Pearson Correlation	-.139*	.912**	1	.577**	.535**
	Sig. (2-tailed)	0.031	0.000		0.000	0.000
	N	240	240	240	240	240
e146_FREQ_sentence_linking	Pearson Correlation	0.027	.566**	.577**	1	.921**
	Sig. (2-tailed)	0.682	0.000	0.000		0.000
	N	240	240	240	240	240
e146sentence_linking	Pearson Correlation	-0.028	.533**	.535**	.921**	1
	Sig. (2-tailed)	0.670	0.000	0.000	0.000	
	N	240	240	240	240	240

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Glossary

Anaphora =def the process for referring back to a word or phrase used earlier in a text.

Adjuncts =def adjuncts in Systemic Functional Linguistics are distinguished by metafunctions and classified into circumstantial adjuncts (experiential), modal adjuncts (interpersonal), and conjunctive adjuncts (textual). Relevant to this study, conjunctive adjuncts establish a contextualizing relationship between the sentence as a message and another text segment.

Alliteration =def the repetition of initial sounds in a poem is an example of the creation of meaning (i.e., logogenesis) at the phonological level according to Halliday's Systemic Functional theory.

B2 English Level =def the fourth level of attainment, which corresponds to the independent user as suggested by the Common European Framework for the teaching, learning, and assessing of English as a foreign or second language.

Cataphora =def the process for referring forward a word or phrase that is used later in a text.

CEFR Standards =def an acronym that refers to the Common European Framework of Reference for Languages to describe L2's attainment at basic, intermediate, and advanced levels.

Cohesion =def the set of lexico-grammatical textual resources used by speakers to build relationships of meaning in different segments of a text.

Coherence =def the understanding derived from the text by the reader.

Conjunctive =def another word for conjunction/connective that refers to a word or words that help speakers to join words, clauses, paragraphs, and the entire text together.

Connective =def prototypically, a word or phrase used to join one part of a text to another.

Co-referential =def when an expression is referring to the same reference (e.g., person, event, or thing), they are co-referential.

Deictic =def words related to utterances of time, place, or person (e.g., now, here, you).

EFL/ESL =def acronyms referring to the learning of English as a Foreign Language in contexts where English is not a dominant language, while English as a Second language is the learning of English where it is commonly used.

Embedding clauses=def inserted clauses used to provide more information to the reader/speaker.

Givenness =def this term is associated with 'given' (i.e., 'known' or 'old') information as opposed to 'new' ('unknown') information and how these two types of information are distributed in a text.

Global Cohesion =def refers to the relationships of meaning occurring beyond the sentence level of a text.

Homophoric =def the identity of an item is retrieved by self-referencing rather than from another specific reference in a text.

Hypotactic =def shows the logical relationships occurring between clauses and sentences.

Ideational Function =def one of the three metafunctions proposed by systemic Functional Linguistics, which relates to the ideas expressed in a sentence.

Intralingual =def pertaining to a single or same language.

Lexical Overlap =def Another term for word repetition.

Local Cohesion =def Refers to the relationships of meaning that occur at the sentence level of a text.

Lexical Bundle =def a group of two or more words that appear together very frequently.

N-Gram =def a set of contiguous words classified in sequences of two, three, or more co-occurring words (e.g., bigrams, trigrams, 4-grams).

Nominal Group =def in the Systemic Functional Linguistics, the nominal group represents an entity which comprises the modifier, the head, and the qualifier.

Paratactic =def the placing of independent phrases or clauses having equal status.

Periphrastic =def the use of longer expressions instead of shorter ones.

Phoric Reference =def pronouns have the characteristic to provide directions to help the reader or listener, as in pointing to the previous discourse (anaphoric reference), pointing to the following discourse (cataphoric reference), and pointing to an external situation (exophoric reference).

Pronominal =def pronouns that can replace the nominal group or noun phrase (e.g., personal, reflexive, demonstrative, interrogative pronouns).

Reference =def the relationship that occurs between specific words (e.g., nouns, pronouns) and the objects that they are referring to in a text.

Run-on Sentences =def the improper connection of two or more independent sentences.

Semantical Similarity =def the measuring of meaning or the relationship occurring between words in a text.

Structural Relations =def the analysis of how text constituents (e.g., words, phrases, clauses, parts of speech) are assembled in a text.

Systemic Functional Linguistics =def an approach to linguistics wherein social semiotics or the understanding of how people communicate is crucial for the analysis of language.

Subordination Links =def words or phrases to help writers/speakers connect dependent clauses and independent clauses (e.g., ‘and’, ‘but’, ‘while’, ‘despite of’).

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