

## Multilingual Advantage in Lexical Cohesion: A Comparative Analysis of Bilingual and Multilingual Graduate Students' Theses in Applied Linguistics

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### Abstract

Lexical cohesion (LC) is an important index that could make a text scholarly and publishable. Despite the recognition of LC as a vital component of scholarly writing, the extent to which authors' linguistic background might influence LC use has been rarely addressed. This paper was a novel attempt considering the effects of four linguistic backgrounds on LC negotiation in thesis literature reviews crafted by bilingual and multilingual graduate students in applied linguistics. The study selected 70 theses developed by multilingual Kurdish and Turkish and bilingual Farsi and Arabic MA and PhD students in applied linguistics. Two types of LC, namely local and global, each consisting of three indices of lemmas, synonyms, and content words, were considered for our thematic analysis. The corpus analysis showed that synonym congruity was the most commonly employed LC index, followed by lemmas and content words. The findings also revealed that multilingual Kurdish students used a higher number of LC indices, particularly in terms of global LC. The second group that ranked at the top involved multilingual Turkish writers who mainly relied on local LC. On the other hand, bilingual Farsi and Arabic students used a lower number of LC indicators compared to the other two. The study offers helpful insights for academic writing research and pedagogy.

**Keywords:** bilingual, lexical cohesion, linguistic background, multilingual, thesis

**Citation:** Alinasab, M., Alipour, M., & Ghadimzad, S. H. (2025). Multilingual advantage in lexical cohesion: A comparative analysis of bilingual and multilingual graduate students' theses in applied linguistics. *Applications of Language Studies*, 3(2), 48–74.

Received: 2025-04-07

Revised: 2025-07-13

Accepted: 2025-08-17

Published online: 2025-10-01

P-ISSN: 2588-6975

E-ISSN: 2588-6983

Article type: Research Paper

DOI: 10.22034/jals.2025.2057317.1072



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## 1. Introduction

Scholarly writing is of paramount importance for aspiring students in higher education due to notable reasons, such as graduation and future career opportunities. For instance, graduate students are obliged to write different genres, mainly including theses, research articles (RAs), and proposals, to show their academic qualifications (Mustafa, 2024; O'Leary & Steinkrauss, 2022). Scholars have mostly examined the RA genre from different perspectives, such as genre analysis, student trajectories, and pedagogical issues (Paltridge, 2012). However, developing a thesis is an equally important genre for students, as it is considered obligatory for graduation. This concern is more evident in English as an Additional Language (EAL) settings where non-native students encounter challenges in writing their research reports in English (Abusalim, 2021; Flowerdew & Habibie, 2021; Partridge, 2002).

One area of difficulty is to write a quality academic text in terms of cohesion (Barbaros & Akbaş, 2022; He, 2020; Hyland, 2003; Jordan, 1997; Otagburuagu et al., 2007; Thompson, 2004). In simple terminology, cohesion can be defined as the flow of the text and indicates how different segments of text are connected to each other. According to Halliday and Hasan (2014), cohesion is a semantic concept that refers to the meaning relations existing within a text. Consequently, it is of high importance to write in a cohesive manner in academic writing for various reasons, such as sensitivity and intelligibility (Halliday & Hasan, 1976; Hyland, 2003; Murray, 2012). In other words, cohesion is often interpreted as a feature that connects the sentences to each other, which distinguishes a text from non-texts (Adiantika, 2015; Barbaros & Akbaş, 2022; He, 2020; Hoey, 1991). For instance, when it comes to the factors helping build a coherent text, grammatical cohesion and lexical cohesion (LC) are agreed upon by multiple researchers (Dressler, 1981; Halliday & Hasan, 1976; Johns, 1986; Hoey, 1991; Lee, 2002).

Another area of ongoing debate in previous research on cohesion concerns its connection with text quality, and researchers have reached contradictory results. On the one hand, according to several studies (e.g., Castro, 2004; Zhang, 2000), cohesiveness and writing quality are not always correlated directly. Although readers find it easier to understand and interpret a writer's message in a text when it is more cohesive and coherent (Poudel & Dhankuta, 2018), overusing cohesive ties in a text may hinder the exchange of information

(Carrell, 1982). On the other hand, other investigations have discovered the reverse and found cohesion to be a common and positive feature of quality writing. For example, Chiang (2003) believes that cohesion can be an indicator and predictor of writing quality. Yang and Sun (2012) came to a similar result, demonstrating a substantial correlation between writing quality and appropriate cohesive connections. In the same vein, the sentences in a text must be related to one another to be understandable, as the quality of a phrase or text is defined by its unity and connectivity rather than its length (Brostoff, 1981; But et al., 2006).

Although substantial research has been conducted on cohesion in academic writing, particularly in terms of genre analysis, cohesive device use, and writing quality (Alarcón, 2022; Halliday & Hasan, 1976; He, 2020), there is a distinct lack of studies exploring how multilingual and bilingual students navigate LC in high-stakes academic genres like theses. Previous research has predominantly examined second language (L2) learners in general, often overlooking the unique cognitive and linguistic strategies employed by students fluent in multiple languages. According to Usanova and Schnoor (2021a), multilingual students possess diverse profiles of writing skills, shaped by their complex interactions with multiple languages, which can significantly influence their cohesion strategies. However, the ways in which these linguistic backgrounds affect the use of cohesive ties, particularly in extended academic texts, remain underexplored. In other words, multilingualism and bilingualism introduce intricate dynamics in language use, with students drawing upon multiple linguistic repertoires that impact how they approach LC. Usanova and Schnoor (2021b) highlight that multilingual writers often experience varied levels of lexical access across languages, which can affect their ability to create cohesive and coherent texts. Despite the growing recognition that multilingual writers may adopt distinct cohesion strategies due to the influence of their native languages and cultural contexts, few studies have specifically investigated these effects in thesis writing. Additionally, cultural and educational differences, alongside linguistic proficiency, may significantly shape how cohesion is realized in their writing.

The present study addressed this gap to understand how multilingual and bilingual graduate students manage LC, whether through repetition, collocation, or other techniques. A better understanding of these strategies provides valuable insights into the challenges they face and offers more inclusive pedagogical practices tailored to the needs of multilingual and

bilingual students. This, in turn, can support their ability to produce cohesive and coherent academic texts.

## **2. Cohesion in Writing: A Review of Theoretical and Research Grounding**

Writing cohesively involves balancing ideas, balancing form and purpose, shifting words, paying attention to syntax and phrasing, and using imagery and metaphor to create a coherent message (Jago, 2002). A good number of models of cohesion have been proposed. These models deal with cohesion from different perspectives:

- Linguistic-stylistic by Enkvist (1976)
- Procedural/relational model by De Beaugrande and Dressler (1981)
- A stratification framework by Gutwinski (1976)
- Halliday's systemic functional grammar by Halliday and Hasan (1976)

A tripartite paradigm for the examination of coherence in text is outlined by Halliday and Hasan, on which the analytical approach was mostly founded. Three parameters are concurrently addressed by the framework: (1) cohesiveness density; (2) cohesive device dispersion; and (3) cohesive tie distance.

As noted above, cohesion is an important factor in well-formed discourses and reflects connectedness among utterances (Košutar et al., 2024). LC is one main type of cohesion that describes the semantic connections between lexis. In other words, an integrated text is produced by the connection between lexical units and structures. In another definition, LC refers to the semantic relationships between words and phrases within a text, contributing to its overall unity and comprehensibility (Halliday & Hasan, 1976). LC is usually created by collocation and reiteration (Adiantika, 2015). The former is the term used when lexical elements occur together, and the latter is the act of referring back to anything that was previously discussed in a sentence or earlier paragraphs, commonly known as repetition. It would be simpler for any reader to match strings in a series of phrases if lexical items were repeatedly used (Chan et al., 2000). Reiteration can be manifested through metonymy, antonymy, hyponymy, synonymy, and repetition (Thompson, 2013). Furthermore, Liu and Braine (2005) found in their study that LC is the most frequent form of cohesion that students use in their writings.

Recently, special attention has been devoted to the relationship between cohesion and coherence (e.g., Carrell, 1982; Tanskanen, 2006) and cohesion across registers or genres, such as conversations (González, 2011, 2013), business discourse (Johns, 1980), literary works (Moini & Kheirkhah, 2016), government documents (Trebits, 2009), and legal texts (Fakuade & Sharndama, 2012). In addition, less usage of cohesion techniques like lexical links and conjunctives is used among L2 learners, although these techniques are essential for writing effective academic essays with persuasive power. Comparing the essays of L2 learners to those of first language (L1) learners, virtually less is known about the dimensions of cohesiveness (He, 2020). A study done by Mustafa (2024) indicated that the most prevalent flaws in L2 learners' academic writing were grammar problems (tenses and pronouns), conjunctions, capitalization, and word variety. Because of the overgeneralization in the target language, these mistakes may result from disregard for the writing guidelines during composition. The study of lexical cohesiveness in conversational discourse was the focus of González (2011, 2013). The findings demonstrated that the most common LC strategy was repetition and that lexical coherence was crucial for building rapport with others during talks. Similarly, Alarcon (2013) for Filipino college students among the three essay groups and in another study, Jaya and Marto (2021) indicated that the most common lexical cohesive strategy used was repetition, and then antonyms, meronyms, and hyponyms, and superlatives and collocations were less common. Moreover, the study by Alarcón (2022) gives important bits of knowledge into the use of cohesion in L2 composing and offers practical suggestions for course planning, teaching, and materials development. It highlights the need for a more comprehensive and nuanced approach to instructing cohesion in L2 writing. Another study by Kawase (2021) inspected the organization of sentences within the introduction section of applied linguistics RAs, establishing a niche for their studies. The study utilized the CARS model (Swales, 2004) to recognize sentences used for the niche establishment move, and Rhetorical Structure Theory (RST) (Mann et al., 1992; Mann & Thompson, 1988) to analyze how these sentences are related to each other in this process. The findings recommend that scholars adopt diverse ways to relate sentences depending on the steps by which they realize the niche-establishment move. For instance, scholars who establish a niche by showing a gap in past research tend to utilize a concessive or contrastive connection to relate the gap statements to the depictions of past studies. On the other hand, those who build up a niche by showing how their studies would

expand past research within the field tend to utilize a background connection to claim a niche based on the particular studies (Kawase, 2021).

Applied linguists have focused heavily on the study of L2 learners' written composition (Murphy, 2001). Murphy notes that most language learners believe that certain criteria of lexical richness are essential to any meaningful description of measurement (Kadiri et al., 2016). This implies that in order to concentrate on the evolution of lexis, applied linguists establish a clear distinction between the categories of grammar and lexis when addressing the problem of the development of L2 writing, as it is separated into two categories by Halliday and Hasan (1976). Moreover, cohesion and coherence play a part in affecting beginning and more advanced L2 language learners. L2 students with low language proficiency who encounter certain challenges in properly choosing and using cohesive ties (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 (Lema Alarcón, 2022).

Despite the extensive body of literature examining cohesion in academic writing, particularly through the lenses of genre analysis, the application of cohesive devices, and overall writing quality, there remains a significant void in research specifically addressing the experiences of multilingual and bilingual students in high-stakes academic settings, such as thesis writing. The existing research has largely overlooked how these students navigate LC, an essential component of effective academic writing, particularly in extended texts. While Usanova and Schnoor (2022) highlight the diverse writing skill profiles of multilingual students, the intricate ways in which their linguistic backgrounds influence their cohesion strategies, especially in thesis contexts, have not been thoroughly investigated. As multilingualism and bilingualism introduce complex dynamics in language use, it is crucial to examine how these factors specifically affect the writing processes of students in high-stakes academic environments. This article attempted to answer the following questions:

- 1) Are there any significant differences between global and local LC use in thesis writers?

- 2) Does linguistic background (Azeri Turkish, Persian, Kurdish, and Arabic) impact students' negotiation of LC (global and local)?
- 3) How do multilingual and bilingual graduate students in applied linguistics manifest LC in writing their theses in English?

### **3. Method**

#### **3.1. Context of the Study and Corpus**

This study was carried out in an applied linguistics MA and PhD program offered by a public high-ranking university in Iran. This university includes students from several linguistic backgrounds due to its particular geopolitical position in the region. Higher education students speak mainly in four languages, including Azeri Turkish, Persian, Kurdish, and Arabic. Turkish students speak English and Farsi in addition to their mother tongue and are considered multilingual in our context. Similarly, multilingual Kurdish students are fluent in Farsi, Turkish, and English. However, Farsi and Arabic students speak English and their mother tongue and are known as bilinguals. In our context, students apply for MA or PhD programs to gain promotion in a career, improve academically, or prepare for overseas studies. Both programs at this university adhere to a coursework+thesis format, offering three semesters for the courses and three for theses or dissertations. The master's program involves courses on language teaching methodology, research methods, psychology in language teaching, language testing and assessment, linguistics, writing academic texts, seminar in teaching, and English for Specific Purposes (ESP). The course instructors often include course assignments on their syllabi, which typically require students to conduct mini research studies and prepare a report. After completing the courses, MA students choose a supervisor from among faculty members and start to write their research proposals and theses. It should be noted that supervisors help students choose research topics and decide on methods and procedures for conducting their studies. The main writing of the proposal and thesis is undertaken by students, for which they receive feedback later on from the supervisor. MA students are under no obligation to extract and publish an RA based on their thesis in order to graduate, though published RAs gain scores in viva sessions. On the other hand, the PhD program at this university offers courses on language teaching methodology, advanced language testing, curriculum design, discourse analysis, and mixed methods research. Similar to MA students, PhD candidates launch their

proposal projects after completing the third semester. However, prior to the proposal phase, they must participate in an in-house comprehensive exam tapping into their theoretical knowledge of applied linguistics based on the courses across three semesters. The comprehensive exam is delivered in two forms, with the first involving paper-and-pencil essay-type questions and the second including oral interview sessions. Unlike the MA program, the PhD system obliges students to publish RAs based on their dissertations in Scopus or JCR ranked journals in applied linguistics and then request the viva session. The published RA or the acceptance letter from the target journal must be presented to the examining board in the session to gain the score.

The aim of this study was to examine LC negotiation at global and local levels by multilingual graduate students of applied linguistics when crafting their research reports. The study selected the thesis genre as the target corpus of LC analysis considering two key benchmarks: 1) theses are far extended compared to RAs or proposals, and the researchers could find more instances of LC, 2) In this context, students write up theses relying less on their supervisors, while other genre, such as RAs, are rather co-authored by students and supervisors. Thus, the thesis genre lends itself easily to our analysis as it reflects extended examples of purely student-produced research writing. Based on these inclusion criteria, the study selected 70 MA (n=30) and PhD (n=10) theses for the main analysis. The specialized corpus included the theses published between 2018 and 2023, which covered a range of recently trending topics in applied linguistics. In corpus selection, the researchers tried to include an equal number of theses written by students from all linguistic backgrounds. The theses published at the target university are formatted in five chapters consisting of introduction, review of the literature, method, results and discussion, and conclusion. This format is followed by both MA and PhD candidates when preparing their theses. The study considered the review of the literature chapter for the text analysis for two reasons. First, this chapter is the most detailed and extended part of the thesis, and the researchers could go further in analyzing the text when few instances of LC were found. Second, in this chapter, writers could discuss a wide range of topics and sub-topics in addition to the main one. Thus, seemingly, it was more likely to find more representative instances of LC. The literature reviews selected included 10000-20000 word counts. It is worth noting that the university

granted the researchers permission to download the theses from the online system of thesis submission and prepare them for analysis and coding.

### **3.2. Coding Scheme and Procedures**

The present paper reports on LC negotiation by higher education students of applied linguistics in a multilingual university. In order to examine the target corpus, the study reviewed the literature on LC to identify its common indices. First, it was found that LC is commonly categorized into global and local types (Zhang & Zhang, 2023). While global cohesion reflects lexical congruence between adjacent paragraphs, local cohesion denotes the commonality at the adjacent sentence level. Second, there was a wide range of indices reported for LC, including lemmas, synonyms, semantic similarity, content word overlaps, and other lexical overlaps (Crossley, 2016; Zhang & Zhang, 2023). The study intended to develop a coding scheme that best suited the scope, which was rather a fledgling area in the context. Therefore, it was far from possible to include all previously reported indices in the coding scheme. The study drew upon Crossley et al. (2016) and Zhang and Zhang (2023) to come up with LC indices to shape the direction of this study. The aim was to identify LC indicators and operationally define them. Following a consultative meeting among researchers, the authors agreed to include two LC indices for the coding at global and local levels and labeled them as lemma congruity and synonym congruity. Lemmas were defined as basic word forms in terms of adjectives, adverbs, and nouns, and synonyms were interpreted as semantically related words based on meaning similarity. The researchers consulted the coding scheme with two leading scholars in corpus studies and academic writing through email. They believed that the index component could include more categories to enjoy more credibility in the analysis. Based on their expert feedback, content word congruity was added to the indices. Content word congruity was considered a semantic association among words that shared a common higher-order meaning. Table 1 sketches the final coding scheme for LC with respective indices and definitions.

To address the first research question, the study conducted a manual text analysis to detect instances of LC throughout MA and PhD theses. In the first round of analysis, the instances for each index were identified and coded. Two colleagues (field specialists and academic writing instructors in applied linguistics) in the department were invited to recode

the data to ensure inter-coder reliability, and the researchers qualitatively reached agreement on most of the coded instances. The Cohen’s Kappa coefficient between two of the raters was found to be .09 (90 percent), which is a strong value in reliability analysis. In the analysis phase, first, the differences between local and global LC frequency using an independent samples t-test were compared (second research question). Next, the frequency of each LC index separately for each type of thesis written by Azeri, Farsi, Kurdish, and Arabic speakers was calculated. To check the effect of linguistic background on LC exploitation, including global and local, a MANOVA was run to detect the differences among the four.

**Table 1**

*LC Coding Scheme Based on Crossley et al. (2016) and Zhang and Zhang (2023)*

	<b>Indices</b>	<b>Definitions</b>	<b>Samples*</b>
<b>Local</b>	Lemma congruity	Congruence between adjacent sentences in terms of basic word forms across adjectives, adverbs, and nouns	It was a <u>beautiful</u> day. The <u>beauty</u> of the sun made it more special.
	Synonym congruity	Congruence between adjacent sentences that included words with proximity in meaning	The car is <u>fast</u> and <u>speedy</u> . It can <u>accelerate rapidly</u> on the highway
	Content word congruity	Congruence between adjacent sentences that included words with similar higher order meanings	The garden center sold a range of <u>flowers</u> , such as <u>roses</u> , <u>lilies</u> , and <u>tulips</u>
<b>Global</b>	Lemma congruity	Congruence between adjacent paragraphs in terms of basic word forms across adjectives, adverbs, and nouns	Paragraph 1: The girl was <u>happy</u> that day because.... The following paragraph: this <u>happiness</u> did not last long as....
	Synonym congruity	Congruence between adjacent paragraphs that included words with proximity in meaning	Paragraph 1: The teacher was very <u>kind</u> during the term The following paragraph: Her <u>compassion</u> made us like her
	Content word congruity	Congruence between adjacent paragraphs that included words with similar higher order meanings	Paragraph 1: The family went to the dealership to browse some <u>cars</u> . The following paragraph: They also searched among <u>trucks</u> and <u>motorcycles</u> .

## 4. Results

### 4.1. Quantitative Findings

#### 4.1.1. Local and Global Lexical Cohesion Indices

The first part of the analysis was run to detect the total number of local and global LC indices. The total count of LC indices in multilingual students' theses was found to be 40000. Table 2 shows the number of local and global indices in terms of lemma, synonym, and content word congruity.

**Table 2**

*LC Indices*

Type	Lemmas	Synonyms	Content
Local	9051	12949	8000
Global	3200	5348	1452

According to Table 2, the student authors in this study relied more on local LC (total count = 30000) than on global manifestations (total count = 10000). In addition, it is clear from the table that synonym congruity is the most frequently used LC component in both local and global analysis, followed by lemma and content word congruity. An independent samples t-test was also used to look for statistically meaningful differences between local and global LC manifestations in multilingual students' theses. This confirmatory analysis ( $t=3.41$ ,  $df=4$ ,  $sig=0.02$ ) revealed that the difference between local and LC uses was statistically significant ( $p<0.05$ ).

#### 4.1.2. LC and Linguistic Background

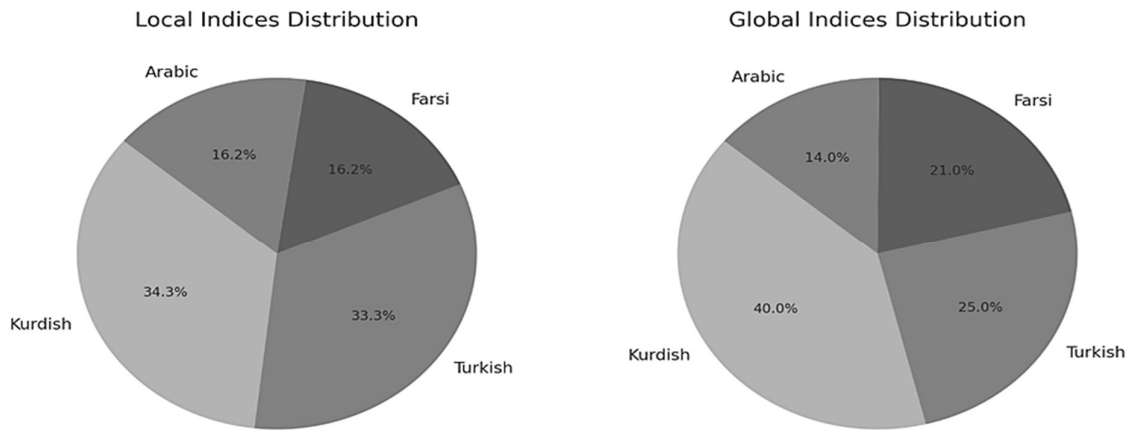
To address the second research question, the study analyzed the differences among Kurdish, Turkish, Farsi, and Arabic-speaking students in terms of their use of LC indices. Figure 1 sketches the percentage of local and global indices employed by the four writer communities.

The analysis revealed Kurdish students' pioneering performance in exploiting LC (total count = 14300) in terms of both local and global indices. However, as Figure 1 depicts, they used global indices more frequently compared to local LC. Turkish-speaking students ranked second in terms of LC use (total count = 12500), manifesting local indices more commonly

than global LC. Farsi and Arabic-speaking students performed almost similarly concerning LC uses (total counts = 6955 and 6265, respectively). These students used a higher number of local indices compared to global LC. Tables 3 and 4 illustrate the MANOVA and post-hoc analysis of LC comparisons among the writer communities.

**Figure 1**

*LC Used by Four Writer Communities*



**Table 3**

*MANOVA Results of LC Use Across Writer Communities*

Effect	Wilks' Lambda	F	df1	df2	Sig.
Group	0.007	19.032	6	2	0.00

\**p* value is significant at <0.05

**Table 4**

*Post-Hoc Comparisons (Tukey HSD) of LC Among Writer Communities*

Comparison	Local Indices Mean Difference	Global Indices Mean Difference	Std. Error	Sig.
Kurdish vs Turkish	300	1500	524.40	0.076
Kurdish vs Farsi	5445	1900	524.40	0.031*
Kurdish vs Arabic	5435	2600	524.40	0.008*
Turkish vs Farsi	5145	400	524.40	0.888
Turkish vs Arabic	5135	1100	524.40	0.271
Farsi vs Arabic	10	700	524.40	0.625

\**p* value is significant at <0.05

According to Table 3, the difference among the writer communities in terms of LC use is statistically significant. In Table 4, one can understand that the difference between Kurdish and Farsi, Kurdish and Arabic-speaking students' LC use is statistically meaningful ( $p < 0.05$ ). This finding holds true in the case of both local and global LC indices. Despite mean differences, other comparisons in Table 4 between writer communities are not statistically meaningful ( $p < 0.05$ ). Based on the analysis, synonym congruity was the most commonly used LC index by all writer communities. Lemma and content word congruity followed this ranking. In sum, linguistic background does have a determining role in writers' use of LC in their theses. This finding was particularly noticeable in the Kurdish and Turkish-speaking writer communities.

## 4.2. Qualitative Findings

### 4.2.1 Local LC Instances

In this study, local LC is defined as the congruity manifested between adjacent sentences. Three indices of lemma, synonym, and content word congruity were considered in analyzing local LC. The corpus in this study included a good number of synonyms as the dominant way to local LC. This was especially bold in Kurdish students' literature reviews. Excerpt 1 was written by a Kurdish Master's student and includes synonym congruity:

- (1) *Stages involved in the Writing process have been the center of attention in previous research. In another case study, Zamel investigated the composition processes in six advanced ESL writers...* (Local LC analysis, synonym congruity)

In this example, "Composition processes" and "writing processes" are used interchangeably as synonyms, indicating proximity in meaning. In this specific example, other terms such as developing texts, drafting, and crafting as indicators of local synonym congruity were found. The other group, which showed superior performance in exploiting local LC, included the Turkish students. Excerpt 2 belongs to a Turkish-speaking writer:

- (2) *Mobile-mediated instruction (MMI) leverages mobile devices. Nowadays, smartphones, tablets, and laptops are the dominant tools used in mobile-based teaching ...* (Local LC analysis, synonym congruity)

Excerpt 2 clearly shows the lexical congruity in two neighboring sentences. Mobile-mediated/mobile-based and teaching/instruction pairs show that the text maintains meaning proximity through similar words. In our corpus, the second type of commonly employed local LC included lemmas. Excerpts 3 and 4 indicate local lemma congruity:

(3) *In her case study, Sommers focused on the role of revision in composition which she thought as the most neglected areas in writing. Revising a text is one of the main components of writing process, as she notes...*( Local LC analysis, lemma congruity)

(4) *Grammarly provides real-time corrections on grammar, punctuation, style, and tone in a timely manner. It also offers recommendations to correct grammatical errors and typos, highlights incorrect punctuation, and provides suggestions for better readability and clarity. Writers can enhance writing style, word choice and coherence, analyze the tone of writing to match what the writer wants, identify and highlight the potential plagiarism from a vast database of web and academic papers, check the proper citation and choose more precise and appropriate vocabularies to avoid the overused words...* (Local LC analysis, lemma congruity)

Excerpts 3 and 4 belong to Kurdish and Turkish students' theses, respectively. In extract 3, the terms revision and revising are consistently used to discuss the process of reviewing and improving written compositions. The basic form of the word revise is maintained through noun forms in two adjacent sentences, which is an indicator of local lemma congruity. Excerpt 4 shows a good number of lemma instances. The forms of the words correct (corrections, correct), highlight (highlights, highlight), and choose (choose, choice) indicate the writer's consistency in using the basic meaning through different forms, which helps reinforce the focus on Grammarly's functionality in this particular example.

Local LC was also manifested through content word congruity in this study. For example, the excerpts below were extracted from Farsi and Arabic students' texts, respectively:

(5) *The findings demonstrated that the final drafts produced by the students were more coherent, organized, and complicated, which helped students better prepare the last version. They were supposed to hand in the thesis at the end of the course...*(Local LC analysis, content word congruity)

- (6) *Learning engagement is an important dimension of language education. This engagement with multimedia has the potential to instill enthusiasm for academic pursuits among children...*(Local LC analysis, content word congruity)

In extract 5, the use of final drafts and the last version shows proximity in lexical meaning related to the higher-order term thesis. Similarly, the same content word congruity is recognizable among engagement and enthusiasm and education and academic pursuits in adjacent sentences in extract 6. Using these lexical proximities, writers try to keep connected with a higher-order meaning category, which is engagement and education in this case.

#### *4.2.2. Global LC Instances*

Global LC in this study was examined in terms of the three indices of lemma, synonym, and content word congruity. The study defined global LC as the proximity in meaning that is apparent in adjacent paragraphs. In terms of global cohesion, Kurdish students used a higher number of the three indices. Other writer communities, namely Turkish, Farsi, and Arabic, also employed a fairly good number of global LC indices. Excerpts 7-9 show lemma, synonym, and content congruity found in the text developed by three Kurdish students, respectively:

- (7) *Paragraph 1: The necessity of adapting instructional methodologies is evident, particularly for students immersed in a technological environment...*

*Paragraph 2: Many writers and academics have commonly acknowledged and underscored the importance of technology integration into second language instruction...* (Global LC analysis, Lemma congruity)

- (8) *Paragraph 1: Incorporating multimedia elements significantly influences the educational context, particularly learning new words in ...*

*Paragraph 2: Vocabulary repertoire encompasses the collection of words within a given language. Multi-method teaching impacts the way new words are acquired and internalized...* (Global LC analysis, synonym congruity)

- (9) *Paragraph 1: Assessment is of principal importance in English as a Foreign Language (EFL) settings, especially in Iran, where speakers' foreign language proficiency is questioned...*

*Paragraph 2: Teachers' written corrective feedback (WCF) plays a crucial role in non-native contexts and the quality of students' writing... (Global LC analysis, content congruity)*

These excerpts show that Kurdish students preserved LC between two adjacent paragraphs by means of the meaning proximity existing among words. In extract 7, the lemma is maintained across the two paragraphs, which is manifested through the basic forms of instruction and technology. Similarly, extract 8 is a clear indicator of synonym congruity that is shown by using the pairs like multi-media/multi-method, vocabulary/word, and learn/acquire. Such connectivity in meaning is evident in the words multi-method, corrective feedback, non-native, and acquired, which are respectively related to the higher-order meanings of multi-media, assessment, EFL, and learning. Like Kurdish writers, other writers in this study reasonably used global LC in their theses. Experts 10-12 are written by Turkish, Farsi, and Arabic students, respectively:

(10) *Paragraph 1: There are many different types of cultural diversity in any society, including factors such as marginalized or socially excluded groups; ethnicity, sexual orientation, disability, values and cultural norms...*

*Paragraph 2: Culture dialogue and respect for diverse groups are more essential than ever in a world where people are becoming more and more closely interconnected (Global LC analysis, Lemma congruity)*

(11) *Paragraph 1: The significance of the concept of formality becomes more noticeable when it comes to writing an RA. RAs which now stand as a genre of their own, require academic writers to follow specific conventions among which formality concerns are of paramount importance...*

*Paragraph 2: Liardét et al., for instance, state that formal language is contrasted with informal language in composing texts, considering the absence of explicitly informal features such as colloquial expressions... (Global LC analysis, synonym congruity)*

(12) *Paragraph 1: The branch of computer-assisted language learning (CALL) has evolved significantly over the past few decades, and with the recent explosion of*

*web-based and mobile apps and resources, interest in mobile-assisted language learning (MALL) in particular has grown as well...*

*Paragraph 2: Previous research, some of which was discussed, has shown that AI-based computers and mobile systems and applications have an indisputable impact... (Global LC analysis, content word congruity)*

The writer in extract 10 maintained the basic forms of culture and diversity in the second paragraph, which are connected in meaning to cultural diversity in the previous paragraph. Extract 11 is another indicator of synonym congruity evident in the formality/formal language and writing/composing pairs. The last extract shows global LC by means of content words. The writers employed the words AI, computers, mobile, systems, and applications to keep the meaning attached to the higher-order concepts of CALL and MALL.

## **5. Discussion**

This study analyzed bilingual and multilingual students' theses in terms of local and global LC indices. The findings generally demonstrated that local indices were more frequently used LC indicators, and synonym congruity was found to be the most frequently employed index in both local and global LC. A follow-up analysis of the theses showed that Kurdish students had the greatest overall usage of LC and favored global indices, and Turkish students mostly used local indices. Both Farsi and Arabic students showed similar LC patterns, with a preference for local cohesion. Statistical analysis confirmed significant differences between multilingual Kurdish and Turkish students and bilingual Farsi and Arabic students regarding LC use. The finding to be highlighted here is that multilingual students use a higher amount of LC indices compared to bilingual students in writing scholarly genres such as theses. These results could imply that linguistic background affects LC manifestations, such that knowing and mastering more languages might help employ frequent LC-like features. In this context, Kurdish students, for example, could speak Farsi, Turkish, Kurdish, and English, while an Arabic student could speak Arabic and English. This can further show that multilingualism is an effective factor in LC use, reflected in applied linguistic theses. These findings align with the claims made by Usanova and Schnoor (2021a) that multilingualism promotes writing skills in different contexts. In a broader sense, Cenoz and Gorter (2011) noted that multilingual speakers develop their creativity in language practices and perform better in certain activities. In addition, the

effect of multilingualism on lexical ability is reflected in Halsband's (2006) study of language processing by multilinguals, whereby local cohesion indices may be related to the strategic function in manipulating the cognitive load when writing academic texts.

The findings of this study further indicated that bilingual and multilingual students tend to use local LC indices in writing academically. That means students used the cohesive ties at the adjacent sentence level more than in neighboring paragraphs. This finding makes sense when we consider EAL higher education students' focus on constructing grammatically correct sentences and ensuring coherence at a more immediate level. In other words, the cognitive load associated with writing in a foreign language can make it challenging for writers to simultaneously maintain a broader perspective on the overall structure and flow of their text. Indeed, this justification could echo Hyland's (2003) idea that even proficient L2 learners struggle with achieving cohesion when it comes to the macro level of text. This idea can partially explain the under-use of global LC compared to local LC in this study. Moreover, overuse of local indices could be due to the role of short-term memory and language processing in LC, which Brown and Hulme (1995) discuss in their study, suggesting that cognitive psychology and L2 processing could be related. The cognitive load of having to manage several languages may mean that students focus on coherence at the sentence level as a way of negotiating the demands of making sense in English, while keeping alive the resources represented in their multilingual backgrounds.

Furthermore, the study showed that the synonym congruity index of LC, both global and local, was the most frequently employed component in applied linguistics theses. Theoretically, this finding makes sense as synonyms are commonly reported in LC frameworks as an instrumental index. A clear instance is the taxonomy proposed by Halliday and Hasan (1976), which describes LC as consisting of repetition, synonymy, subordinate, antonymy, hyponymy, and metonymy. The study showed that frequent synonym use in academic writing is commonly reported as repetition of certain vocabulary items, and a number of studies have found that due to learners' lack of L2 proficiency and vocabulary knowledge, repeating lexically similar words is a dominant strategy to show cohesion in writing (Alarcon, 2013; Mirzapour & Ahmadi, 2011; Sidabutar, 2021). Interestingly, certain language processing mechanisms could contribute to the overrepresentation of synonym congruity in the theses analyzed in this study. In other words, in an attempt to remain focused and coherent in their

writing, the students tend to use repetition along with the use of a given synonym repetitively to compensate for any deficiencies in their English vocabulary mental repertoire (Ransdell et al., 2001). However, the conclusion drawn by Zarepour (2016) that other linguistic features, such as antonymy, are used more commonly than synonyms in LC studies makes us skeptical about our idea that synonymy can be the most dominant LC index in all cases. The discrepancy can be attributed to the type of written genre, namely essays and theses, analyzed in the two studies. Theses are written by higher education students and involve a research domain that needs to be consistently mentioned throughout the text to attract readers' attention to that domain. On the other hand, the same may not be essential in writing essays at the bachelor's level, where writers can use different indices to complete the essay. For example, in writing an argumentative or compare-contrast essay, writers might use opposite words more frequently than synonyms to deliver the topic. Thus, the uniform application of synonym congruity at the local level across all groups of this study indicates that this index is accessible and practical for EAL graduate writers to preserve the clarity and coherence in their work.

The findings underline the necessity of taking into account the interaction between local cohesion, short-term memory, language processing, and multilingualism in LC analysis in academic writing. It is with consideration of these cognitive dimensions related to language proficiency and students' varied linguistic backgrounds that we can get to grips with what shapes their writing strategies and develop tailored support mechanisms. This may allow effective systematization and expression of ideas in academic English.

## **6. Conclusion**

The study reported in this paper targeted the academic writing practice in a context that has been rarely considered by previous research. It tried to address an important feature of advanced writing, LC, in a multilingual graduate program where students from diverse linguistic backgrounds have to write scholarly texts, such as theses and RAs, in English. The LC analysis of Kurdish, Turkish, Farsi, and Arabic students' theses indicated that the first two groups employed LC indices more than the other two did. It was also found that Kurdish writers commonly used global LC indices, while Turkish students relied more on local LC features in writing their theses. In addition, one interesting finding concerned Farsi and Arabic students' theses that included a meaningfully smaller number of LC indices. In terms of specific LC

indices, synonym congruity was the most frequently used feature, which was followed by lemma and content word congruity.

The findings of this study can contribute to academic writing theory and practice in several ways. First of all, the framework suggested was a different representation of LC with newly defined indices. This would revitalize the LC conceptualizations posed by previous studies, which mainly addressed global and local LC in terms of synonyms and repetitions (Halliday & Hasan, 1976). An important contribution of this framework may be the operational definitions provided for local and global LC and respective indices. Such definitions can help further LC theoretical principles, awareness, and understanding in academic writing research. Second, the study showed that the amount of LC use could depend on writers' linguistic background and the number of languages they know and speak (Usanova & Schnoor, 2021b). In other words, multilingualism positively contributed to LC use in this study. Such findings offer insights for academic writing practice, teaching, and assessment. Above all, the findings could help bridge the gap between cohesive writing and certain challenges posed by linguistic background. For example, in this study, Farsi and Arabic writers could not develop lexically cohesive texts compared to Kurdish and Turkish writers (Mustafa, 2024). Therefore, bilingual writers can use the reports on LC to improve their advanced writing practice and build more cohesive texts.

Moreover, both bilingual and multilingual writers can consult these findings to enhance their understanding of LC and its specific components. For instance, it would be a good idea to develop scholarly texts using lemma and content word congruity in addition to the most commonly known and employed synonym congruity (Liu & Braine, 2005). Second, the present findings could inform academic writing instruction at graduate and postgraduate levels. Advanced writing instructors may need to pinpoint students' trajectories in developing lexically congruent scholarly genres, such as RAs, proposals, and theses, and integrate LC-like features and respective sub-features (like content word LC) into their teaching plans (Alarcón, 2022). Indeed, designing hands-on tasks on LC indices can help students improve their scholarly writing abilities. This contribution gains significance when we consider the importance of scholarly publication, in which producing well-organized, coherent texts is an indispensable requirement for aspiring researcher students (González, 2011, 2013). Thus, incorporating LC features into advanced writing and English for Research Publication

Purposes (ERPP) is another point that we call for in this paper. One effective strategy involves the creation of targeted writing programs that focus on LC in academic contexts. Such programs should include workshops that not only teach the mechanics of cohesive devices but also explore their application across different languages. By integrating multilingual resources into the curriculum, educators can empower students to leverage their linguistic repertoires of native and target languages. This approach encourages students to transfer cohesion strategies from their first languages to their academic writing in a second or foreign language, which can, in turn, foster confidence and competence in writing courses.

The findings could also contribute to academic writing testing and help assessors evaluate the quality of student works using benchmarks like LC and its components. For example, LC can lend itself easily to automatic scoring systems that include other language-related aspects, such as grammar and punctuation (Kawase, 2021). In addition, LC indices can be integrated into other traditional writing rubrics or scoring guides and help raters make informed and objective decisions on student writing.

This study has some caveats that must be considered when interpreting the findings. First, the study analyzed a small specialized corpus consisting of a portion of a complete thesis. Whether LC indices are detectable in other parts of the thesis or the whole thesis is uncertain. More specifically, the study encountered certain limitations in sampling theses. For example, the researchers could have access to the theses and dissertations published between 2018 and 2023, and more recent texts were not available. Besides, among these theses, only a few matched the study's inclusion criteria. Moreover, the study merely addressed adjacent-type LC and did not ensure whether LC can be used in other parts of the texts that are not in the proximity of each other. Future research should first examine LC manifestations in the chapters of a complete thesis, such as methods or discussion, above all. This direction can be extended to other scholarly genres, such as RAs or proposals, which students are obliged to develop in educational settings for different purposes, such as a future career or graduation. Furthermore, follow-up studies are warranted to consider non-adjacent-type LC to determine whether scholarly writers follow similar patterns to adjacent-type LC and draw implications for academic writing practice. LC research can produce promising results in undergraduate writing, which acts as a springboard to advanced scholarly writing at the graduate level. A different research strand can be launched to understand whether LC can be integrated into

systematic academic writing assessment. Future researchers are recommended to design and pilot LC-powered scoring guides, consisting of LC indices, based on empirical evidence.

### **Conflict of interest**

The author(s) certify/certifies that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in the present research paper.

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