Author(s): Khushik, Ghulam Abbas

Title: Is the variation in syntactic complexity features observed in argumentative essays produced by B1 level EFL learners in Finland and Pakistan attributable exclusively to their L1?
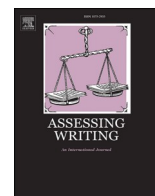
Year: 2024

Version: Published version

Contents lists available at ScienceDirect

Assessing Writing

ELSEVIER

Is the variation in syntactic complexity features observed in argumentative essays produced by B1 level EFL learners in Finland and Pakistan attributable exclusively to their L1?

Ghulam Abbas Khushik

Centre for Applied Language Studies, University of Jyvaskyla, Jyvaskyla, Finland

A R T I C L E   I N F O

A B S T R A C T

This study has explored the syntactic complexity features of English learners at the B1 Common European Framework of Reference (CEFR) (CoE, 2001) level from both Pakistan and Finland. The learners in question were taught English as a Foreign Language (EFL) using different pedagogical methods. This study took into account various factors including the learners' proficiency level, age, and grade, as well as variations in their native language. To assess the impact of the learners' native language and pedagogical methods on syntactic complexity features, twelfth grade EFL students from Upper-Secondary schools in both nations were given identical instructions and time limits to complete an English academic essay on the same topic. The study utilized L2 syntactic complexity analyzer (L2SCA) to extract fourteen syntactic complexity features, and Mann-Whitney U Tests were used to analyze the differences in the syntactic complexity features between the two groups. The study has revealed significant differences between Finnish and Pakistani EFL learners due to variations in their native language and the effects of pedagogical methods on syntactic complexity features. The implications of this study extend to language testing and assessment, the CEFR framework, and pedagogy in both Finland and Pakistan.

1. Introduction

A plethora of scholars who specialize in second language acquisition (SLA) and language testing have conducted extensive research regarding the correlation between second language (L2) complexity and proficiency, particularly in the context of L2 writing. Noteworthy contributors to this field include Bulte and Housen (2014), Wolfe-Quintero et al. (1998), and Ortega (2003).

Bulte and Housen (2012, Fig. 1) have delineated L2 complexity into relative and absolute complexity, with the latter comprising of three branches. Recent studies have homed in on linguistic complexity, which is a subdivision of absolute complexity. Among the elements of linguistic complexity, syntactic complexity has been meticulously investigated in L2 development and writing proficiency by diverse scholars, including Crossley et al. (2008, 2014, 2015); Guo et al. (2013); Lu (2011), and Khushik (2023); Yang, Lu and Weigle (2015). Ortega (2003) has defined syntactic complexity as "the spectrum of forms that evolve throughout language formation and their degree of sophistication.".

This study adheres to the definition of complexity, as stated by Bulte and Housen (2014), that complexity is a quantifiable and factual attribute of language units, features, and systems. This definition takes into account the discrete components that constitute the unit/feature/system, as well as the nature and number of interconnections between these components. This study focuses on syntactic

complexity, a multidimensional construct introduced by Bulte and Housen (2012) and Norris and Ortega (2009). From a language testing research perspective, this construct is not typically employed in the written texts of EFL learners concerning Common European Framework of Reference (CEFR) (CoE, 2001) levels (Khushik & Huhta, 2020). Language testing research aims to ascertain the syntactic characteristics of test takers at varying skill levels. By analyzing written texts categorized based on the CEFR levels, language testers can better understand CEFR skill levels.

The Common European Framework of Reference for Languages (CEFR) has established itself as a widely recognized and influential standard in European language education, with far-reaching implications for non-European language education programs as well. It has provided the international language testing community with an essential reference and has significantly impacted high-stakes assessments (Hulstijn & Little et al., 2010, p. 648; North, 2007; Wisniewski, 2017). These scales define each proficiency level's functional competence and communicative functions, with learners at the A2 communicative proficiency level expected to have equivalent abilities regardless of their first language. The levels also elucidate the information and abilities learners need to develop to learn and acquire a language effectively (see Table 1).

Despite the usefulness of the CEFR, there remain certain challenges and a need for more research to refine and enhance the CEFR proficiency levels. For instance, the CEFR does not provide information on the specific language features that learners at each competency level are expected to use, as outlined in Table 1. According to Hulstijn et al. (2011, p. 204), it is unclear whether learner performance at the six functional levels defined in Chapter 4 corresponds to the linguistic characteristics defined in Chapter 5. Additionally, researchers such as Lah (2016, p. 66) and Pizorn (2014, p. 244) note that the CEFR levels do not consider the context, language, or nationality of the learners. It is also important to note that the CEFR's descriptors for written production were mainly developed from those for spoken production and were not a major focus of the study (CEFR, 2001, p. 220). As such, there is a need for further research to address these issues and inform the development of more accurate and applicable language proficiency standards. However, it is important to note that the CEFR does not determine the linguistic qualities of competency levels nor consider learners' native languages (L1).

This study investigates the syntactic complexity characteristics of English as a foreign language (EFL) learner who have achieved the B1 level of the Common European Framework of Reference (CEFR) in Finland and Pakistan. The learners in both countries were of
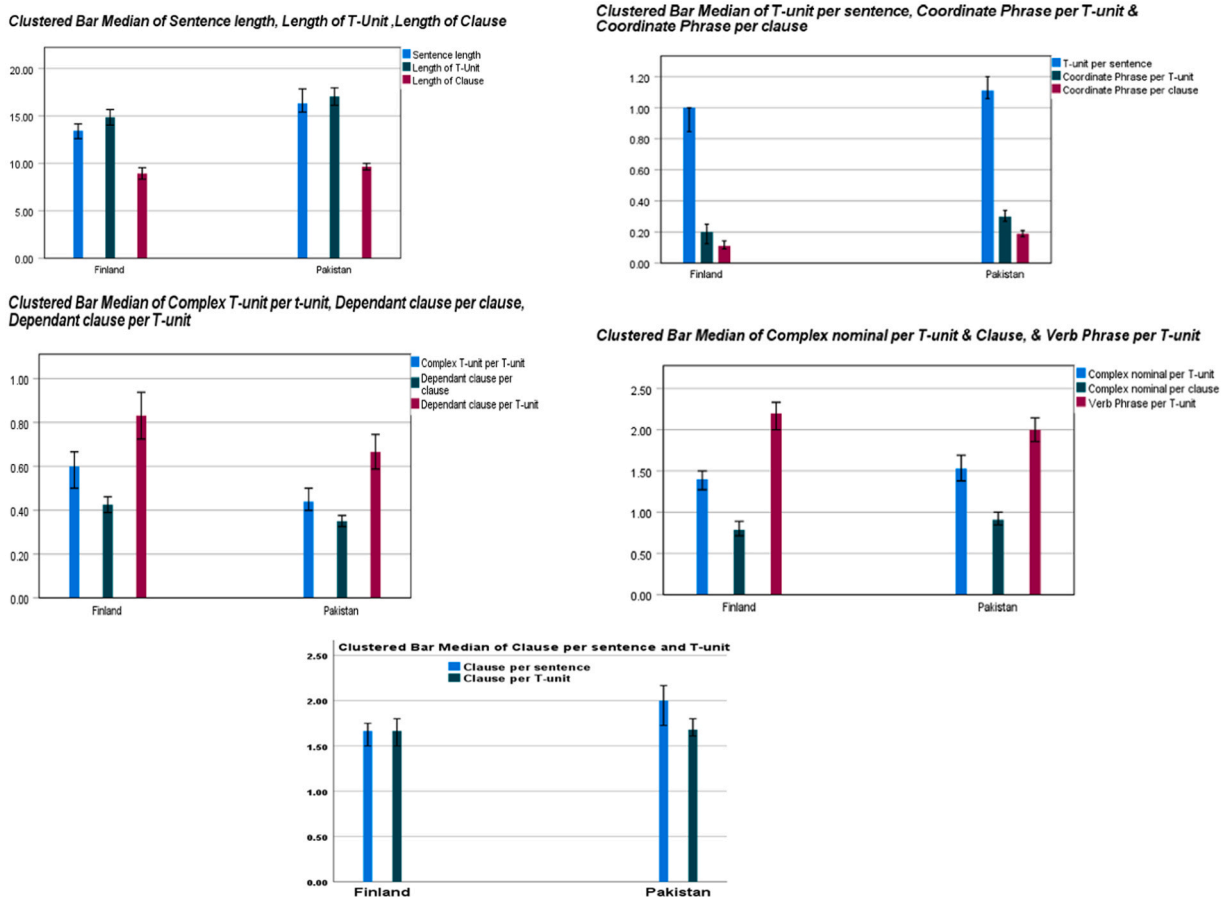

Fig. 1. cluster Bar charts (CI 95%) at CEFR level B1 for 12th grade and two L1 groups (Finnish and Sindhi) for length measures, subordination, coordination, sentence complexity indices, particular structures indices.

Table 1

Overall written production CEFR scales for levels A1, A2 and B1 (CoE 2001, p.61).

B1	Can write straightforward connected texts on a range of familiar subjects within his field of interest, by linking a series of shorter discrete elements into a linear sequence.

the same age, proficiency level, and grade, and were given the same topic, time constraints, and guidelines to follow. The contextual differences, native language (L1), and teaching methods were the only factors that varied between the two groups. The objective of this research is to analyze and compare the syntactic complexity of the written output produced by EFL learners in these two countries, in order to identify any differences that may exist due to these contextual factors.

2. Effect of L1 on syntactic complexity in CEFR-related research

This review provides a comprehensive analysis of research conducted on the syntactic complexity features present in the writing of EFL learners across varying CEFR levels. While the studies focus on different aspects, they offer valuable insights into the syntactic complexity features in learners' writing from diverse L1 backgrounds, contexts, and teaching methods. Specifically, research conducted by Bardovi-Harlig & Bofman (1989), Banerjee, Franceschina, and Smith (2007), and Khushik et al. (2020 & 2022) explored the syntactic complexity present in EFL learners' writing among individuals of diverse first languages. However, only the latter explicitly established proficiency levels according to CEFR.

In 1989, Bardovi-Harlig and Bofman conducted a study on a group of EFL writers with diverse L1 backgrounds, including Arabic, Chinese, Korean, Malay, and Spanish. The primary focus of the study was to analyze the average number of clauses per T-unit in the written texts of the learners. Interestingly, the researchers discovered that the clause/T-unit ratio was fairly consistent across all L1 groups, varying only slightly from 2.57 to 2.85. However, it is important to note that the sample size was relatively small, with only six learners in each L1 group. The writing task that the learners were assigned involved describing and arguing for an opinion, and their proficiency level was primarily determined by their TOEFL score, which averaged approximately 550, equivalent to a B2 level on the CEFR.

In the year 2007, Banerjee and colleagues conducted a comprehensive study on the usage of dependent clauses and clauses per T-units in two distinct groups of individuals. These individuals had Chinese and Spanish as their primary language of communication. The data for this research was extracted from the International English Language Testing System (IELTS) examination. The IELTS test required the candidates to undertake two tasks: describing a graph (task 1) and expressing an opinion with supporting evidence (task 2). The comparative statistical analysis of the usage of dependent clauses was not carried out between the two language groups. However, the descriptive statistics revealed the possibility of a variance in the usage of dependent clauses between the two language groups and task types. The study discovered that individuals who spoke Spanish as their primary language and were using English as their second language had a higher mean ratio for clauses per T-unit across levels 4 to 8 of the IELTS exam, which corresponds to CEFR A2-C1. This was particularly evident in task 2. Upon reaching level 6 of the exam, which is equivalent to B2, both language groups had nearly identical scores for this indicator.

The investigation carried out by Khushik et al. (2020) delved into the impact of a learner's first language (L1) on their syntactic complexity in the context of English as a foreign language (EFL) writing. The study's participants were drawn from both Pakistan and Finland and ranged from the 8th to the 12th grade. Regrettably, the study failed to account for both age and grade, which have been established as significant factors in prior research. Furthermore, the study sought to scrutinize the development of syntactic complexity across a variety of Common European Framework of Reference (CEFR) levels, with a nominal emphasis on L1 groups.

The present study diverges from Khushik et al.'s research in that it concentrates on only 12th-grade learners from Pakistan and Finland while simultaneously controlling for age and grade. Additionally, our study aims to identify the distinct syntactic features evident in Sindhi and Finnish learners at one CEFR proficiency level. Specifically, we examine the features that differentiate at B1 level and the common changes in features attributable to the L1 and pedagogical method's effect. Furthermore, this study presents a succinct summary of antecedent research undertakings that have delved into the extent of syntactic complexity present in each proficiency tier as specified by the Common European Framework of Reference for Languages (CEFR).

Despite the dearth of available data regarding how the non-native English background of a writer may influence sentence complexity, it remains possible to compare syntactic characteristics at each CEFR level, taking into account the diverse native languages of the learners (see Table 6).

In a study conducted by Kim in 2004, 33 written scripts of Chinese (L1) university students who were pursuing English for specific purposes (ESP) at CEFR levels A2, B1, and B2 were subjected to analysis using clause- and T-unit-based indices. Kim's analysis focused on various clauses, such as adverbial, dependent, and adjective clauses per clause, the amount of subordination, and phrasal sophistication.

The scripts belonging to the Cambridge Learner Corpus (CLC) underwent analysis by Hawkins and Filipovi (2012) and Green (2012). This investigation anylysed an undisclosed number of CLC scripts, consisting of exam responses on varied topics from students of diverse nationalities and varying L1s. English served as their secondary or foreign language. Hawkins and Filipovi (2012) and Green (2012) evaluated only those learners who achieved grades A, B, and C, disregarding the unsuccessful participants assigned to CEFR levels A2 to C2. Hawkins and Filipovi (2012) discovered that there were noticeable alterations in sentence length for learners at A2, B1, B2, C1, and C2 levels (refer to Table 6). Similarly, Green (2012) identified significant disparities in sentence length for learners at B2 and C1 levels, sentence syntax similarity (across adjacent and all paragraphs) for B2 and C1, and noun phrase incidence for learners at

B1 and B2 levels (refer to Table 6).

In the year 2017, an analysis of written work produced by a significant number of students, was conducted by a research team led by Alexopoulou. The findings of the study revealed that approximately two-thirds of the scripts contained corrections made by the teachers, who utilized a list of 24 error labels to effect the necessary changes. The scripts were subjected to a rating system, which ranged from A1 to C2, with shorter scripts (comprising 20–40 words) receiving lower ratings and longer scripts (consisting of 150–180 words) receiving higher ratings. The data collected included 128 individual tasks, each comprising three pairs of narrative, descriptive, and professional tasks. Upon comparing A1 to A2, A2 to B1, and B1 to B2, the researchers observed significant differences in average sentence length, mean clause length in words, and subordinate clauses per T-unit. A comprehensive summary of the descriptive information can be found in Table 6.

This overview presents a valuable analysis of various studies that demonstrate notable variations in results, as illustrated in Table 6. It is critical to consider the possible factors that could contribute to these disparities. One such factor could be the informants' primary language of communication, as highlighted in studies that have compared learners with different L1s but the same proficiency level. In some studies, the learners had only one mother tongue, while in others, the corpora included multiple L1s. For instance, when examining the mean sentence length of B1-level EFL learners, the highest values were observed in Sindhi L1 learners (18 words per sentence) by Khushik et al. (2020), whereas Polat (2019) reported 11.4 words per sentence for Turkish L1 learners at the B1 level. Therefore, differences in L1 may have a significant impact on the findings regarding the relationship between SC, L1 and context of the learners at particular CEFR level. Notably, prior research focused on only a few indices, employed different methodologies, and utilized slightly distinct indices.

3. Teaching writing in Finland versus Pakistan

A recent study by Khushik (2023) has shed light on the teaching of writing in English in Finnish and Pakistani context. It was noted that although the communicative approach to language instruction has gained popularity, traditional grammar-focused instruction still holds a significant place in education in Finland. According to Korhonen's (2010) research, students often improve their writing skills through individual, pair, or group sessions. However, in Finland, writing instruction does not receive as much attention as other language abilities. In primary schools, only 7% of instructional time is allocated for writing instruction, while in lower secondary schools, it is 4% or less (OECD, 2018). For EFL, writing receives even less time, at approximately 1% of instructional time in primary education and around 5% in lower secondary schools. Nevertheless, writing gains importance in upper secondary school, especially for the Matriculation Examination, which includes a written component for English. The student's performance on the writing task heavily influences the final test scores, accounting for about one-third of the grade. Although writing may vary in emphasis in primary and comprehensive education, the ability to produce spoken and written texts remains a crucial criterion outlined in the national curriculum (OECD, 2018).

The English language as spoken in Pakistan has undergone a notable divergence from its origins, with distinct syntactic structures and word choices within sentences that set it apart from native English varieties. Extensive research has identified numerous varieties of Pakistani English that have developed over time, with linguistic challenges attributed to the vast array of English spoken in the region (Muhammad et al., 2012). Rahman (2016) conducted a study on the syntactic use of English by Pakistanis, indicating that their L1 might influence their English, particularly regarding the relative proportions of parts of speech they use. Factors such as varying teaching standards and proficiency levels also play a significant role. Nayyar et al. (2005, p. vi) highlight that "inconsistent teaching standards and poor English" can hinder the development of English as a foreign language among students.

The differences in curricula and textbooks contribute to the considerable diversity in Pakistani English and ongoing changes. The curricula and textbooks used by English language learners in Pakistan vary by school and study level, leading to significant disparities in language quality across educational materials. Nayyar et al. (2005, p. vi) note stylistic flaws, apparent inaccuracies, and pedagogically inappropriate content, as well as "outdated and incoherent instructional approaches that hinder the development of students' attention and insight." Furthermore, Pakistani English students often need to acquire advanced vocabulary and grammar knowledge, along with the ability to construct complex sentences and paragraphs (Siddiqui, 2016; Muhammad et al., 2012). Proper punctuation, phrasing, and paragraph structure are also necessary skills. When translating from their native languages to English, EFL learners often demonstrate L1 interference, adherence to L1 grammar rules, and unconventional spellings.

In conclusion, the linguistic qualities of English writing in the Pakistani context exhibit unique features. The syntactic complexity features analyzed in this study have undergone several syntactic alterations due to the language's use in diverse cultural contexts and by speakers with a range of native tongues (Anwar, 2009, p. 3). Pakistani English is a prime example of this phenomenon, as speakers and writers often switch between their native tongue and English, resulting in noticeable modifications (Anwar, 2009, pp. 2–3). Additionally, local language patterns can evolve and alter grammatical norms, leading to the emergence of a distinct variety of English (Mukherjee & Huber, 2015, p. 412; Mahboob, 2004, p. 1052). Finally, Pakistani English has incorporated several terms from indigenous languages, which is reflected in its increased usage of prepositions observed by Asghar et al. (2014) compared to British English.

4. The current study

The present research endeavours to investigate the syntactic complexity (SC) of academic writing among EFL learners. Specifically, the study seeks to examine fourteen distinct SC indices in written compositions generated by students at the B1 level in 12th grade who possess different native languages but are of the same age and competency level. The ultimate objective is to ascertain whether the student's L1 influences their syntax at this level.

To achieve this objective, the study evaluates the written essays against the Common European Framework of Reference (CEFR) skill levels, which enables a global perspective on language learners' proficiency. This approach facilitates cross-country comparisons of the findings, unlike previous research. To control for genre, discourse mode, and topic effects, students from Pakistan and Finland are directed to write on the same argumentative topic in academic English with identical task instructions.

The study takes into account insights from Ortega (2003), Norris and Ortega (2009), and Wolfe-Quintero et al. (1998) to ensure that the overall nature of SC is adequately reflected in the analysis of various SC indices. By doing so, the study aims to comprehensively evaluate the syntactic complexity of academic writing among EFL learners.

Encountering research that compares learners of identical proficiency levels to determine the comparability of their linguistic attributes, particularly regarding syntactic complexity, is a rarity. Such a study would provide invaluable insights into learners' performance levels within specific competency tiers. As Huhta (2013, p.1) noted, "Learners do not acquire knowledge through identical methodologies, nor do they master comparable concepts.".

5. Methods

5.1. Goal and research question

The principal objective of the present investigation was to explore the syntactic intricacy characteristics manifested by individuals from Finland and Pakistan, who are learning English as a non-native language. The following question is addressed:

Which syntactic complexity characteristics can distinguish Finnish and Pakistani EFL learners who exhibit similar levels of age and proficiency, but distinct native languages?

5.2. A plan for attaining the objective and addressing the research issue

It is widely held that individuals who possess the same level of proficiency within the CEFR necessarily exhibit equivalent linguistic abilities. The CEFR proficiency frameworks employ universally applicable scales to delineate language skill levels across multiple languages. These levels demonstrate that linguistic attributes are comparable among learners of the same language, irrespective of their native language, background, and context. However, it is imperative to acknowledge that learners in disparate regions of the world may develop language skills differently due to diverse contextual settings, educational environments, and mother tongues, all of which can significantly impact the development of foreign language skills.

A comprehensive research endeavour was initiated with the objective of exploring and contrasting the impact of an individual's primary linguistic medium on the level of syntactic complexity evident in the written discourse of Finnish and Sindhi pupils who have attained a B1 standard of competence in English as a second language.

5.3. Participants and writing task

An analysis was conducted on twelfth-grade students in both Finland and Pakistan who were studying English as a foreign language. Participants were specifically selected based on their language learning backgrounds and ranged in age from 17 to 18 years (see, Table 2). This study is unique in its focus on this particular group of learners. It was observed that English is a compulsory subject in Pakistan, beginning in primary and continuing through the final year of upper secondary school. Conversely, in Finland, English is not mandatory, yet a significant majority of students learn it from elementary through secondary school.

The writing topic at hand was derived from a project, which was carried out at the University of Jyväskylä in Finland. As a crucial component of this project, Finnish students, who were in the process of acquiring English language skills as a foreign language, were assigned with the task of composing an argumentative essay in English concerning the topic of "No mobile phones in class." The data pertaining to Pakistan was procured through the implementation of the uniform parameters that were previously utilized in the previous project. The students were closely monitored by both teachers and researchers during the writing process. Uniformity was ensured by providing all students with identical instructions and time limits, and the topic was deliberately kept singular to eliminate any potential impact arising from the genre or mode of discourse. To protect the students' privacy, their identities were substituted with code numbers during transcription.

5.4. Rating of essays

The assessment methodologies and training regimens employed in the rating process were similar in both Pakistan and Finland. It is imperative to note, however, that the Finnish data had previously been collected in DIALUKI project conducted in Finland, while the same procedures were employed to gather and evaluate data from Pakistan. A total of seventeen Pakistani and three Finnish raters

Table 2
The number of EFL learners' texts in the study.

CEFR level	Finland	Pakistan
	12th grade	12th grade
B1	103	103

employed a six-point CEFR writing scale to assess the scripts. The Finnish texts were evaluated by a minimum of three raters, whereas the Pakistani texts were rated by four raters. Additionally, two Finnish raters (out of a pool of three) evaluated roughly one-third of the Pakistani samples, with two of the aforementioned raters having assessed the Finnish scripts in the previous research project. The evaluators, who originated from the nation of Pakistan, possessed a plethora of diverse qualifications, ranging from the master's degree programs to the attainment of doctorate degrees. Furthermore, their extensive backgrounds in instructing EFL spanned five to fifteen years. In contrast, the raters from Finland were university EFL teaching staff members proficient in English, who participated in both prior and ongoing research projects.

An analysis was conducted of all ratings using Facets, a Multifaceted Rasch analysis software developed by Linacre (2009). The purpose of this analysis was to measure the writing ability and text quality of each script, with the measurements being rounded to the nearest CEFR level. To ensure the quality of the ratings, we used Infit Mean Square values, as recommended by Engelhard (1994) and Lunz et al. (1990). During the analysis process, it was discovered that two of the 17 Pakistani raters exhibited significant harshness or leniency compared to the others. Consequently, these raters were excluded from the data analysis. However, the remaining Pakistani and Finnish raters accurately applied the CEFR scales, with only minor differences in their strictness and leniency.

Throughout the entirety of our analysis process, we made a concerted effort to uphold the utmost accuracy of our data. This was a pivotal aspect of our work, and we took great care to ensure that our findings were founded on reliable and trustworthy information.

5.5. Cleaning of the written corpus

According to the research conducted by McNamara et al., (2014, p.155–6), it is highly recommended that automated tools with precise capabilities be utilized to systematically clean at least 95% of corpora in order to extract linguistic features. As a result, the scripts were thoroughly analyzed to remove endnotes, topic names, and topic numbers, while missing punctuation marks were added and spelling errors were corrected to ensure proper word recognition.

In line with the recommendations of Banerjee et al. (2007), exhaustive tests were carried out to ensure that the indexes were not impacted by fragments, errors, or missing punctuation. The automated applications were rigorously assessed to validate their efficacy in detecting and eliminating these errors. To further enhance the accuracy of the corpus, sample texts from the actual data set were scrutinized multiple times, both with and without errors, to determine the categories of mistakes that required rectification.

Additionally, texts that were concise, written in the participants' native language, or contained duplicated instructions and concepts were disqualified. The researcher attended all data collection sessions to identify off-topic texts that could have been detected as plagiarism. Finally, SPSS normality checks were performed on each SC index, and one to three outliers per index were removed as the final step in the data cleaning procedure.

5.6. Linguistic computation

The process of computational linguistics entails the automated identification of linguistic features from a corpus of written or spoken language samples. This is achieved by assigning numerical values to various indices of syntactic complexity (SC), such as sentence length and the number of adverbial phrases. The calculations are based on the ApplePie parser (Sekine & Grishman, 1995) and the POS tagger (Brill, 1995).

In the present study, fourteen features of syntactic complexity were extracted from each text to examine how syntactic complexity features vary due to the effect of the L1 across different CEFR proficiency levels for language learners. This investigation utilised the L2 Syntactic Complexity Analyser (L2SCA).

Table 3 presents the indices calculated using L2SCA, a tool developed by Lu (2010) that generates results for fourteen SC indices, including those recommended by Wolfe-Quintero et al. (1998) and Ortega 2003. The outcomes from L2SCA were exported to SPSS for statistical analysis.

Table 3
Syntactic complexity indices in the L2 Syntactic Complexity Analyzer based on Lu (2010).

Syntactic complexity	Index	Definition and formula
Length of production units	Sentence length	the number of (#) words/# sentences.
	T-unit length	# words/# T-units.
	Clause length	# words/# clauses
Sentence complexity	Clauses per sentence	# clauses/# sentences
Subordination	Clauses per T-unit	# clauses/# T-units
	Complex T-unit per T-unit	# complex T-units/# T-units
	Dependent clauses per clause	# dependent clauses/# clauses
	Dependent clauses per T-unit	# dependent clauses/# T-units
Coordination	Coordinate phrases per clause	# coordinate phrases # clauses
	Coordinate phrases per T-unit	# coordinate phrases/# T-units
	T-units per sentence	# T-units/# sentences
Particular structures	Complex nominals per clause	# complex nominals/# clauses
	Complex nominals per T-unit	# complex nominals/# T-units
	Verb phrases per T-unit	# verb phrases/# T-units

5.7. Statistical analyses

The procedure of data analysis necessitated the performance of normality tests for each syntactic complexity characteristic. Within the Pakistani dataset, two extreme outliers were identified and removed. However, the majority of syntactic complexity variables in
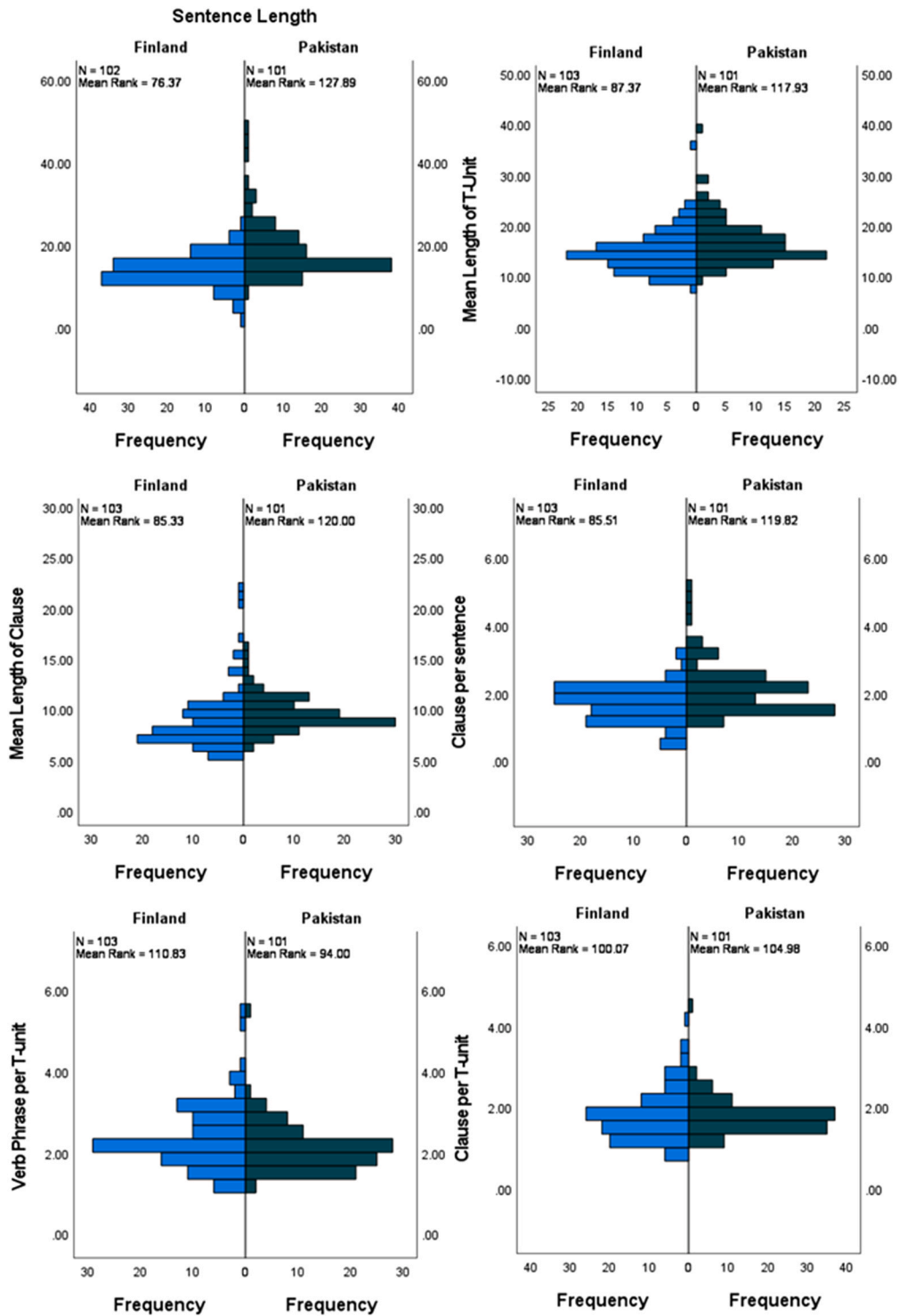
Fig. 2. displays the Mann-Whitney U test results for each syntactic complexity feature at the CEFR level B1, focusing on 12th-grade students from two distinct L1 groups (Finnish and Sindhi).
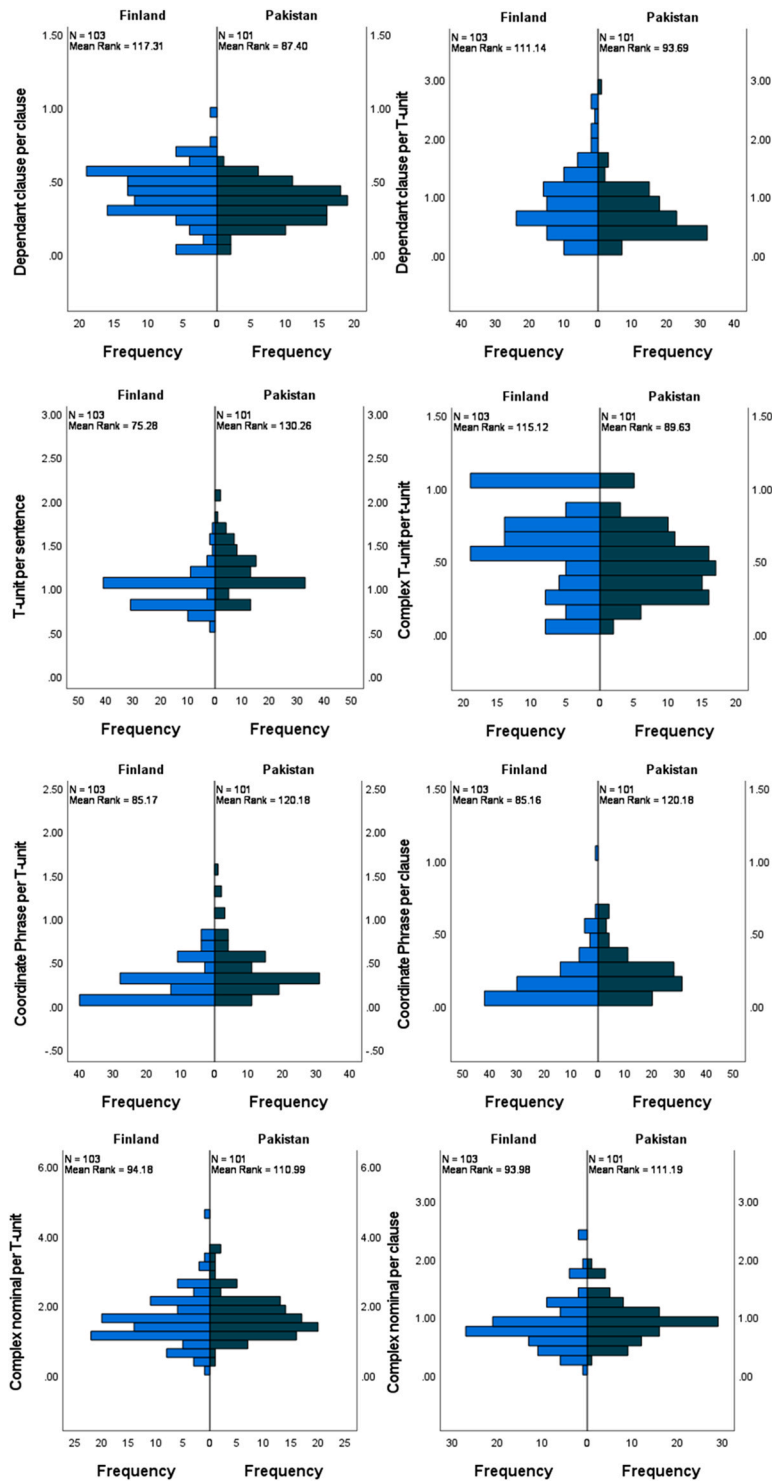
Fig. 2. (*continued*).

the Pakistani context were observed to be skewed, rendering T-tests unsuitable for data analysis. As an alternative, the Mann-Whitney U test was utilized, which is a non-parametric examination that evaluates the variance between two independent groups based on ordinal or non-normal continuous data. Unlike the t-test, which scrutinizes means, the Mann-Whitney U test assesses medians and verifies whether a significant difference exists between the ranks of the two groups. This is accomplished by converting scores into ranks, thereby rendering the actual distribution of the scores irrelevant. The Mann-Whitney U test was employed to compare the

syntactic complexity features of Finnish EFL learners from Finland and Sindhi EFL learners from Pakistan. The Z-value methodology as delineated in Lenhard and Lenhard (2016) was implemented to calculate the effect size.

6. Results

The pedagogical domain of language education holds immense significance in the meticulous analysis of how an individual's primary language (L1) impacts the intricacy of their writing, particularly with reference to the B1 proficiency level, as designated by the Common European Framework of Reference for Languages (CEFR). It is imperative to note that the previous research undertaken in this domain has not yet been able to compare two distinct L1 groups in a controlled setting while taking into account various factors such as age, task type, topic, task time duration, task planning, and instructional settings in English or the native language. These factors have been scrupulously regulated to isolate the impact of L1 and teaching techniques. Our study presents findings in Tables 6.1 and 6.2, which contain crucial statistical values, including P, t, and Cohen's d, as well as descriptive statistics. The results of our study reveal significant differences and similarities in sentence structure complexity at the B1 CEFR level, with notable differences based on L1. The results presented in Fig. 2 are clearly depicted and easily interpretable at the CEFR level B1 for 12th-grade students, encompassing two distinct L1 groups (Finnish and Sindhi). Each individual syntactic complexity feature is graphically represented, providing a comprehensive view of the differences between the two language groups at this intermediate proficiency level. In addition to that, the descriptive findings are presented in Table 5.

6.1. A notable discrepancy exists in the syntactic proficiency between Finnish and Pakistani EFL learners

To address the RQ, we conducted a comparative analysis of the Finnish and Sindhi 12th-grade students at the B1 level to explore the influence of different L1 backgrounds on syntactic complexity characteristics. Our findings indicate that the learners' L1 backgrounds significantly impacted most of the SC indices. We administered a Mann-Whitney U test on each of the fourteen syntactic complexity variables to assess these disparities (see, Table 4 and for descriptive statistics Table 5).

6.1.1. Length production units

The data presented in Table 6 reveals several significant trends regarding the writing abilities of Pakistani EFL learners. Specifically, these learners tend to produce longer units, including sentences, clauses, and T-units, due to the influence of their L1. This trend was evident in most cases, with Pakistani learners consistently generating longer units than their Finnish counterparts of similar age and proficiency.

The results indicate that the Sindhi L1 group of EFL learners from Pakistan exhibited significantly longer sentence lengths than the Finnish L1 group of EFL learners from Finland, with a z-score of 6.248 and a p-value of $< .001$. The Sindhi L1 group also displayed significantly greater T-unit length than the Finnish L1 group, with a z-score of 3.697 and a p-value of $< .001$. Interestingly, the Sindhi L1 group also demonstrated greater syntactic complexity in their writing, despite the length of their production units differing from those of the Finns.

Overall, these findings suggest that L1 influence is a crucial factor in EFL writing, particularly in the case of Pakistani learners. By recognizing this trend, educators can better tailor their teaching approaches to address the unique challenges and strengths of learners from different linguistic backgrounds.

Table 4
Significant L1-related differences in syntactic complexity in the writings of EFL learners from Pakistan and Finland at each CEFR proficiency level.

Syntactic complexity features	*P.*	z	Mann-Whitney U	d_{Cohen}
Length production units				
Sentence length	**< .001**	6.25	7765.50	**1.56**
Mean Length of T-Unit	**< .001**	3.70	6760.00	**0.78**
Mean Length of Clause	**< .001**	4.19	6969.50	**0.91**
Sentence complexity				
Clause per sentence	**< .001**	4.15	6951.00	**0.90**
Subordination				
Clause per T-unit	0.553	0.59	5451.50	0.12
Complex T-unit per T-unit	**0.002**	-3.09	3902.00	0.64
Dependant clause per clause	**< .001**	-3.62	3676.50	0.76
Dependant clause per T-unit	**0.035**	-2.11	4312.00	0.43
Coordination				
T-unit per sentence	**< .001**	6.75	8005.00	**1.78**
Coordinate Phrase per T-unit	**< .001**	4.26	6987.00	**0.93**
Coordinate Phrase per clause	**< .001**	4.26	6987.50	**0.93**
Particular structures				
Complex nominal per T-unit	**0.042**	2.04	6058.50	0.41
Complex nominal per clause	**0.037**	2.08	6079.00	0.42
Verb Phrase per T-unit	**0.042**	-2.04	4343.00	0.41

Note: $d = .20$ (small), $d = .50$ (medium), $d = .80$ (large)

Table 5

Descriptive findings for syntactic complexity features of B1 EFL learners from Pakistan and Finland at the upper-secondary school.

	Finland					Pakistan				
	Mean	Median	Std. D	95% CI Lower Bound	95% CI Upper Bound	Mean	Median	Std. D	95% CI Lower Bound	95% CI Upper Bound
Sentence length	13.61	13.45	13.45	12.89	14.34	18.62	16.33	6.79	17.28	19.96
Mean Length of T-Unit	14.85	14.31	4.19	14.03	15.68	17.05	16.07	4.63	16.14	17.96
Mean Length of Clause	8.94	8.16	3.09	8.34	9.55	9.66	9.31	1.78	9.31	10.01
Clause per sentence	1.65	1.67	0.55	1.54	1.76	2.11	2.00	0.76	1.96	2.26
Verb Phrase per T-unit	2.32	2.20	0.79	2.16	2.47	2.09	2.00	0.60	1.98	2.21
Clause per T-unit	1.79	1.67	0.66	1.66	1.92	1.79	1.68	0.46	1.70	1.88
Dependant clause per clause	0.42	0.43	0.18	0.39	0.46	0.35	0.36	0.13	0.32	0.38
Dependant clause per T-unit	0.83	0.75	0.55	0.72	0.94	0.67	0.59	0.40	0.59	0.75
T-unit per sentence	0.94	1.00	0.20	0.90	0.98	1.18	1.11	0.27	1.12	1.23
Complex T-unit per T-unit	0.57	0.59	0.30	0.51	0.63	0.47	0.44	0.22	0.42	0.51
Coordinate Phrase per T-unit	0.23	0.21	0.23	0.18	0.27	0.38	0.30	0.28	0.32	0.43
Coordinate Phrase per clause	0.15	0.11	0.17	0.11	0.18	0.21	0.19	0.14	0.19	0.24
Complex nominal per T-unit	1.47	1.41	0.71	1.33	1.61	1.62	1.53	0.60	1.51	1.74
Complex nominal per clause	0.86	0.79	0.42	0.78	0.95	0.93	0.91	0.32	0.87	0.99

Table 6

compares the findings of Finnish versus Sindhi 12th graders from the current study to those of adult learners from past studies.

SC features	Adult learners in the present study (17/18-year-olds) Adult learners in previous studies	Mixed (young & young adults) learners in the previous study by AU
B1 CEFR level		
Mean sentence length	13.61 (Finns), 16.36 (Sindhis), 18.40 (A), 10.8 (H & F), 7.61 (P)	13.80 (Finns), 14.78 (Sindhis)
Mean T-unit length	14.53 (Finns), 17.28 (Sindhis), 7.10 (P)	14.62 (Finns), 16.21 (Sindhis)
Mean clause length	8.49 (Finns), 9.87 (Sindhis), 11.49 (A), 4.91 (P)	8.33 (Finns), 9.96 (Sindhis)
Clauses per T-unit	1.79 (Finns), 1.92 (Sindhis), 0.87 (P), 1.71 (Chi5; B), 2.59 (Spa5; B)	1.83 (Finns), 1.66 (Sindhis)
Dependant clause per clause	0.43 (Finns), 0.33 (Sindhis), 0.23 (P)	0.43 (Finns), 0.32 (Sindhis)
Modifiers per noun phrase	0.55 (Finns), 0.62 (Sindhis), 0.93 (GR)	0.55(Finns), 0.62(Sindhis)
Sentence syntax similarity, adjacent sentences	0.08 (Finns), 0.11 (Sindhis), 0.11 (GR)	0.7 (Finns), 0.11 (Sindhis)

Note: Authors of the studies in Table 6, Alexopoulou et al. (2017) = (A); L1 varied, Khushik et al. (2020) = (AU); (L1 Sindhi or Finnish), Banerjee et al. (2007) = (B) (Chi3 / Chi4 / Chi5 = Chinese EFL learners at IELTS band 3, 4 or 5; Spa4 / Spa5 = Spanish EFL learners at IELTS band 4 or 5), Green (2012) = (GR); (L1 varied), Hawkins and Filipović (2012) = (H & F); (L1 varied), Polat et al., (2019) = (P); L1 Turkish

6.1.2. Complexity of sentences

The study focused on analyzing the complexity of sentences, the number of clauses per sentence, and the length of production units. The findings indicated that the group of English as a Foreign Language (EFL) learners from Pakistan with Sindhi as their first language exhibited a substantially higher number of clauses per sentence in comparison to the EFL learners from Finland with Finnish as their first language ($z = 4.154$, $p < .001$).

6.1.3. Subordination

This study investigated the role of subordination in the writing patterns of EFL learners, focusing on factors such as clauses per T-unit, complex T-unit per T-unit, dependent clauses per clause, and dependent clauses per T-units. The findings revealed that EFL learners from Finland, whose native language is Finnish, demonstrated higher complexity in their T-units than EFL learners from Pakistan, whose L1 is Sindhi. This discrepancy was statistically significant ($z = -3.09$, $p = 0.002$). Moreover, the Finnish group exhibited a significantly larger number of dependent clauses per clause in comparison to the Sindhi group ($z = -3.62$, $p < .001$), as well as more dependent clauses per T-units ($z = -2.11$, $p = 0.035$). However, the two groups did not show any significant differences in terms of clauses per T-unit.

6.1.4. Coordination

This study examined the use of coordinate phrases in clauses and T-units per sentence among EFL learners from Pakistan and Finland. The results showed that the Sindhi L1 group from Pakistan used more T-units per sentence compared to the Finnish L1 group, with a significant difference ($z = 6.75$, $p < .001$). Additionally, the Sindhi L1 group also had a significantly higher number of coordinate phrases per T-unit ($z = 4.26$, $p < .001$) and per clause ($z = 4.26$, $p < .001$) compared to the Finnish L1 group.

6.1.5. Particular structures

Finally, this study investigated the complexity of nominals and verb phrases among EFL learners from two different L1 groups,

Sindhi speakers from Pakistan and Finnish speakers from Finland. The research evaluated complex nominals per clause, complex nominals per T-unit, and verb phrases per T-unit. The results indicated that the Sindhi group had significantly higher instances of complex nominals per clause and T-unit than the Finnish group ($z = 2.08$, $p = 0.037$ and $z = 2.04$, $p = 0.042$, respectively). Conversely, the Finnish group exhibited significantly more verb phrases per T-unit than the Sindhi group ($z = -2.04$, $p = 0.042$). These findings suggest that L1 influence plays a significant role in the complexity of nominals and verb phrases in EFL learners.

7. Discussion

The focus of this study is centred on a crucial area of research, namely the language foundation of the CEFR levels (see, Hulstijn, 2007; Bartning et al., 2010; Wisniewski, 2017). Prior research (e.g., Banerjee et al., 2007) has delved into the correlation between language proficiency and syntactic complexity, with specific emphasis on CEFR levels (e.g., Alexopoulou et al., 2017; Hawkins et al., 2012; Green, 2012; Gyllstad et al., 2014; Verspoor et al., 2012). In order to further advance the discourse on this subject, the present study analyzed fourteen indices of syntactic complexity utilizing automated natural language processing systems in order to scrutinize syntactic complexity as an entity with multiple dimensions (see Norris & Ortega, 2009; Bulte & Housen, 2012). The objective of the study is to investigate whether the native language of EFL learners has an impact on their writing's syntactic complexity while taking into account that their overall EFL writing ability, age, and grade are equivalent. To accomplish this goal, learners from two distinct countries were observed.

To better align the findings of this study with prior research, the most pertinent findings from the literature that preceded it are presented. Previous research has compared EFL learners of differing L1 backgrounds with the same ability to learn English as a second language. However, this study is unique in that it compares foreign language learners with disparate L1s while preserving their competency level, age, and grade. The research conducted by Bardovi-Harlig & Bofman (1989), Banerjee, Franceschina, and Smith (2007), and Khushik et al. (2020) are the only ones to have undertaken such a comparison.

The present discussion centers around the potential impact of different L1s amongst EFL learners on the syntactic complexity of their written texts, when the overall quality of the texts is held constant. This issue has been a topic of interest among scholars in the field of second language acquisition and has led to a number of studies exploring the relationship between L1 background and the syntactic features of EFL learners' written output.

The present study serves to present a thorough comparison of the findings on syntactic complexity in the writing abilities of English as a foreign language (EFL) learners with previous research related to the Common European Framework of Reference for Languages (CEFR). To this end, Table 6 display the values for the same SC indices explored in both the current study and past studies, including a non-CEFR-based study conducted by Banerjee et al. (2007), which compared EFL authors with different first languages. The inclusion of this study permits a related comparison to the CEFR scale. Furthermore, a study by Khushik et al. (2020) has investigated EFL learners from the same first language backgrounds as the current study, albeit with a mix of younger and older learners (see, Table 6).

It is crucial to note that this research focuses specifically on the writing abilities of young EFL learners, as their skills are often less advanced. In order to provide further context, the study compares their syntactic complexity at CEFR levels B1. The purpose of this comparison is to identify any areas in which young EFL learners may require additional support or resources to improve their writing abilities. By conducting this analysis, the study aims to contribute to the development of effective language education practices, particularly for young learners.

The conducted investigation has uncovered notable variations in the syntactic complexity of learners' written works, which were found to be contingent upon their native language and consequently impacted their CEFR level. The writing proficiency level was also considered when comparing various syntactical features. The inquiry has demonstrated that the learners' L1 influenced most of the indices for syntactic complexity. Specifically, the length indices were significantly impacted, with Pakistani students tending to compose longer clauses, T-units, and sentences than their Finnish counterparts. The authors conducted an analysis of syntactic complexity, comparing subordination, coordination, and particular structures between Finnish and Sindhi L1 groups at the B1 level (see, Table 7). The study revealed significant differences between the two groups across various syntactic features, as demonstrated by the p-values:

These results provide insight into the unique linguistic characteristics of Finnish and Sindhi L1 groups at the B1 level. They emphasize the importance of examining various syntactic features when analyzing language complexity.

Table 6 presents a comprehensive overview of previous research regarding the impact of an individual's native language on their proficiency in writing English as a foreign language. In the reviewed studies, Banerjee et al. (2007) and Khushik et al. (2020) are particularly relevant. However, the table did not include Bardovi-Harlig and Bofman's (1989) study, which examined higher-proficiency EFL learners (B2). Nevertheless, the above study did not ascertain any significant syntactic complexity (SC) differences among the various L1 groups examined. It is imperative to note that, due to the limited sample size, it is impossible to

Table 7

presents an analysis of syntactic complexity, comparing subordination, coordination, and specific structures between the Finnish and Sindhi L1 groups at the B1 level.

subordination	coordination	particular structures
- Complex T-unit per T-unit: $p = 0.002$	- T-unit per sentence: $p < .001$	- Complex nominal per T-unit: $p = 0.042$
- Dependent clause per clause: $p < .001$	-Coordinate Phrase per T-unit: $p < .001$	- Complex nominal per clause: $p = 0.037$
- Dependent clause per T-unit: $p = 0.035$	- Coordinate Phrase per clause: $p < .001$	- Verb Phrase per T-unit: $p = 0.042$

determine whether subtle or non-existent differences in SC exist based on L1 at higher proficiency levels. Banerjee et al. (2007) caution against such an assumption, as they observed differences in SC between Spanish and Chinese EFL learners at IELTS levels corresponding to B2-C1.

Nevertheless, these differences were not subjected to statistical analysis. Banerjee et al. (2007) also discovered differences in syntactic complexity (measured by clauses per T-unit) between Spanish and Chinese EFL writers at IELTS levels comparable to CEFR levels A2 and B1. Although the significance of these differences was not tested, the B1 level discrepancy (1.71 clauses per T-unit for Chinese vs. 2.59 clauses per T-unit for Spanish) was significant enough to warrant attention.

In contrast, Khushik and Huhta (2020) ascertained significant differences in SC between two L1 groups across CEFR levels A1 to B1. Unlike the present study, which solely concentrates on specific age groups, both L1 groups in Khushik and Huhta (2020) were composed of learners from grades eight to twelve, regardless of age control. The Sindhi-speaking group included learners from all five grades, while the Finnish group only had learners from grades eight and twelve.

Despite the variances between the investigation conducted by Khushik and Huhta (2020) and our current research, which primarily lie in the exclusive utilization of CEFR levels by the former and the absence of learners' ages as a classification factor, we affirm that the outcomes of both studies are comparable. Our inquiry further corroborates the conclusions drawn by Khushik and Huhta (2020) by delving into the impact of learners' primary language on syntactic complexity. Furthermore, we ensured that the age of the learners was duly taken into account during our analysis, thereby reinforcing the credibility and validity of our findings.

Throughout our discourse, we shall delve into the intricacies surrounding the factors that contribute to the disparities in English language aptitude exhibited by Sindhi and Finnish EFL learners. The study has revealed that the utilization of the English language in Pakistan is characterized by distinctive attributes. Furthermore, the linguistic background of the Pakistani participants, whose first language is Sindhi, may have exerted a discernible influence on the incongruities that were identified during the course of the research.

Cultural, linguistic, and pedagogical factors can significantly impact the composition of the writing of those acquiring a foreign language. Using a language in varying cultural and educational contexts may result in various syntactical shifts, leading to diverse English variations (Anwar, 2009). Pakistani English, for instance, exhibits notable differences and variants due to the practice of code-switching from the writers' mother tongue to English (Mukherjee & Huber, 2015). Additionally, local linguistic patterns may contribute to grammatical changes and the emergence of a new variety of English. Pakistani speakers tend to use alternate prepositions compared to their British counterparts, and Pakistani English has integrated numerous words from indigenous languages (Mahboob, 2004). Consequently, prepositions play a more prominent role in Pakistani than in British English (Mahboob, 2004; Mahmood & Ali, 2011). Furthermore, Pakistani learners may demonstrate interference from their primary language and follow its grammatical rules and irregular spellings when engaging in English translation (Muhammad et al., 2012).

A notable variance was observed between Sindhi and Finnish EFL learners regarding their production unit indices. Despite comparable writing levels and ages, Sindhi learners displayed a proclivity towards generating longer clauses, T-units, and sentences than their Finnish counterparts. Khushik and Huhta (2020) attribute this incongruity to the predilection of Sindhi EFL learners towards producing longer phrasal-level units in their writing. In the ensuing deliberation, we shall scrutinize some of these phrasal-level occurrences and their potential causes arising from Pakistani English usage.

A study conducted by Baumgardner in 1993 discovered that individuals who speak English in Pakistan exhibit a greater propensity for utilizing gerunds while displaying a tendency to employ fewer infinitives in comparison to their British counterparts. The findings of Mahmood's and Ali's (2011, p. 98) and Talaat's (2002) research indicate that there exists a noticeable contrast in the frequency of nominal and noun phrases between Pakistani corpora and British and American corpora. This observation suggests that there might be significant disparities in the utilization and occurrence of particular linguistic structures among diverse languages and cultures.

Notable disparities in various indices related to second language acquisition have been observed among individuals who speak Sindhi as their first language and are attempting to learn English as a foreign language. These differences in performance may be attributed to specific underlying factors. One potential reason for this discrepancy is that Pakistani students in this study attended schools of varying types, including public, semi-private, and private institutions. Differences in curricula, textbooks, and instructor quality across these schools contributed to inconsistencies in the way these students acquired and utilized English language skills. For example, Nayyar et al. (2005) documented those certain institutions in Pakistan struggle with uneven lesson standards and subpar English instruction, which may impede the development of students' English proficiency. Nayyar et al. (2005) have been researching Pakistan's English curriculum and textbooks, which are predominantly used for teaching English in educational institutions. The researchers discovered that books aimed at specific grade levels in different schools had varying levels of language complexity, resulting in significant disparities in English proficiency standards from one school to another in Pakistan. Consequently, the more substantial variations in competence levels among Pakistani EFL learners may be directly linked to these discrepancies.

The development of writing skills among students in Pakistan, particularly in the English language, necessitates significant improvement in numerous areas, including syntax, coherence, content selection, idea expansion, topic sentences, rhetorical conventions, mechanics, organization, and vocabulary usage (Ahmad et al., 2013; Javed et al., 2013), and Siddiqui, 2016). Moreover, the issue of inappropriate word selection remains a primary concern. Also, English proficiency among teachers is a significant issue in Pakistani English. Incompetent English language teachers are increasingly prevalent nationwide (Siddiqui, 2016). The root cause of these deficiencies in writing can be attributed to the inadequate pedagogical methods employed by educators who lack appropriate methodologies for teaching writing, as emphasized by Ahmad et al. (2013), Javed et al. (2013), and Siddiqui (2016).

8. Limitations

The study at hand, though insightful, is subject to certain limitations that should be taken into consideration. Firstly, the sample

size, which consisted of twelfth grade EFL students from Upper-Secondary schools in Finland and Pakistan, may not be fully representative of all CEFR level learners. In addition, the study had limited control over the variables such as individual learning styles, motivation, and previous language exposure, which could potentially introduce confounding factors. Furthermore, the homogeneity of the participant groups and the limited scope of the analyzed features may limit the breadth of insights that can be gained from the study. Lastly, it is worth noting that the study did not fully address cross-cultural factors that could influence writing styles and syntactic complexity, especially in a comparative analysis between Finnish and Pakistani EFL learners. It is worth noting, however, that any single study can only provide a limited perspective and may not account for all relevant factors. Therefore, it is recommended that the investigation of syntactic complexity features in EFL learners be approached from multiple angles that take into consideration various factors that may influence syntax. For further insights on this topic, interested readers can refer to the works of Khushik and Huhta (2020 & 2022), and Khushik (2023).

9. Conclusion

The present investigation endeavors to scrutinize the influence of the first language on the syntactic intricacy of Pakistani and Finnish English as a Foreign Language (EFL) learners at Common European Framework of Reference (CEFR) level B1. The writing samples of both cohorts were methodically scrutinized, while taking into account variables such as age, grade, and proficiency level. The results have brought to light significant disparities between Sindhi-speaking and Finnish-speaking EFL students, implying that the native language plays an indispensable role in the cultivation of writing skills in EFL. These findings make a meritorious contribution to the existing corpus of literature on the linguistic underpinnings of CEFR levels in EFL writing, as antecedent research failed to take into account the learners' first language and pedagogical practices.

In summary, this study aimed to explore how the first language affects the syntactic complexity of B1-level Pakistani and Finnish English as a Foreign Language (EFL) learners according to the Common European Framework of Reference (CEFR). By carefully analyzing written samples from both groups and accounting for variables such as age, grade, and proficiency, notable differences between Sindhi-speaking and Finnish-speaking EFL students were identified. Specifically, measures of syntactic complexity such as T-unit length, subordination ratio, and types of subordinate clauses were found to be effective discriminators. These findings suggest that a learner's native language is a critical factor in developing writing abilities in EFL education. This study contributes to the existing research on CEFR levels in EFL writing, emphasizing the significance of considering first language and pedagogical methods for a more nuanced comprehension of syntactic complexity.

CRediT authorship contribution statement

Ghulam Abbas Khushik: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Data Availability

The data that has been used is confidential.

References

Ahmad, N., Khan, F. N., & Munir, N. (2013). Factors affecting the learning of English at secondary school level in Khyber Pakhtunkhwa, Pakistan. *International Journal of English Language and Literature Studies, 2*(2), 95–101.

Alexopoulou, T., Michel, M., Murakami, A., & Meurers, D. (2017). Task effects on linguistic complexity and accuracy: A large-scale learner corpus analysis employing Natural Language Processing techniques. *Language Learning, 67*, 180–208.

Banerjee, J., Franceschina, F., & Smith, A. (2007). Documenting features of written language production typical of different IELTS band score levels. In , *7. IELTS Research Reports*. IELTS Australia and British Council.

Bulte, B., & Housen, A. (2012). Defining and operationalising L2 complexity. In A. Housen, F. Kuiken, & I. Vedder (Eds.), *Dimensions of L2 Performance and Proficiency. Investigating Complexity, Accuracy and Fluency in SLA* (pp. 21–46). Benjamins.

Bulte, B., & Housen, A. (2014). Conceptualizing and measuring short-term changes in L2 writing complexity. *Journal of Second Language Writing, 26*, 42–65.

Council of Europe. Council for Cultural Co-operation. Education Committee. Modern Languages Division. (2001). *Common European framework of reference for languages: Learning, teaching, assessment*. Cambridge University Press.

Crossley, S., Allen, L. K., Snow, E. L., & McNamara, D. S. (2015, March). Pssst. textual features... there is more to automatic essay scoring than just you!. Proceedings of the fifth international conference on learning analytics and knowledge (pp. 203–207).

Crossley, S. A., & McNamara, D. S. (2014). Does writing development equal writing quality? A computational investigation of syntactic complexity in L2 learners. *Journal of Second Language Writing, 26*. https://doi.org/10.1016/j.jslw.2014.09.006

Crossley, S. A., Greenfield, J., & McNamara, D. S. (2008). Assessing text readability using cognitively based indices. *Tesol Quarterly, 42*(3), 475–493.

Engelhard, G. (1994). Examining rater errors in the assessment of written composition with a many-faceted Rasch model. *Journal of Educational Measurement, 31*, 93–112.

Green, A. (2012). *Language functions revisited: Theoretical and empirical bases for language construct definition across the ability range*. Cambridge: Cambridge University Press,.

Guo, L., Crossley, S. A., & McNamara, D. S. (2013). Predicting human judgments of essay quality in both integrated and independent second language writing samples: A comparison study. *Assessing Writing, 18*(3), 218–238.

Gyllstad, H., Granfeldt, J., Bernardini, P., & Källkvist, M. (2014). Linguistic correlates to communicative proficiency levels of the CEFR: The case of syntactic complexity in written L2 English, L3 French and L4 Italian. In L. Roberts, I. Vedder, & J. Hulstijn (Eds.), *EUROSLA Yearbook, 14* pp. 1–30). Amsterdam: John Benjamins.

Hawkins, J., & Filipović, L. (2012). *Criterial Features in L2 English: Specifying the reference levels of the Common European Framework*. Cambridge: Cambridge University Press,.

Huhta, Ari (2013). Common European Framework of Reference. In Carol A. Chapelle (Ed.), *The Encyclopedia of Applied Linguistics*. Blackwell Publishing Ltd.

Hulstijn, J., Alderson, J.C., & Schoonen, R. (2010). Developmental stages in second-language acquisition and levels of second-language proficiency: Are there links between them. In Bartning, I., Martin, M., Vedder, I. Eds., *Communicative Proficiency and Linguistic Development: Intersections between SLA and Language Testing Research pp.11–20. Eurosla Monographs Series 1.*

Hulstijn, J. H. (2007). Fundamental issues in the study of second language acquisition. *EuroSLA Yearbook, 7*(1)), 191–203.

Javed, M., Juan, W. X., & Nazli, S. (2013). A study of students' assessment in writing skills of the English language. *International journal of instruction, 6*(2).

Khushik, G. A., & Huhta, A. (2020). Investigating syntactic complexity in EFL learners' writing across common European framework of reference levels A1, A2, and B1. *Applied Linguistics, 41*(4), 506–532.

Khushik, G. A., & Huhta, A. (2022). Syntactic complexity in Finnish-background EFL learners' writing at CEFR levels A1–B2. *European Journal of Applied Linguistics, 10* (1), 142–184.

Khushik, G. A. (2023). How do the Common European Framework levels differ in terms of linguistic features?: analysing English language learners' written corpora by using Natural Language Processing tools. *JYU Dissertations.*

Lah, M. (2016). Learners between Childhood and Adulthood: Assessing Writing Competences of Teens Learning French as a Foreign Language. *Center for Educational Policy Studies Journal, 6*(1), 49–70.

Lenhard, W. & Lenhard, A. (2016). Computation of effect sizes. Retrieved from: https://www.psychometrica.de/effect_size.html. Psychometrica. DOI: 10.13140/ RG.2.2.17823.92329.

Linacre, M. (2009). *A user's guide to FACETS v 3, 66* p. *0*). Chicago: Winsteps,.

Little, D. (2007). The Common European Framework of Reference for Languages: Perspectives on the making of supranational language education policy. *The Modern Language Journal, 91*(4), 645–655.

Lu, X. (2010). Automatic analysis of syntactic complexity in second language writing. *International Journal of Corpus Linguistics, 15*, 474–496.

Lu, X. (2011). A corpus-based evaluation of syntactic complexity measures as indices of college level ESL writers' language development. *TESOL Quarterly, 45*, 36–62.

Lunz, M., Wright, B., & Linacre, J. (1990). Measuring the impact of judge severity on examination scores. *Applied Measurement in Education, 3*, 331–345.

Mahboob, A. (2004). The English language in Pakistan: A brief overview of its history and linguistics. *Pakistan Journal of Language, 4*(1), 1–28.

Mahmood, M., & Ali, N. (2011). Circumstance adverbials in Pakistani English a corpus-based comparative analysis. *International Journal of Academic Research, 3*(5), 47–51.

McNamara, D., Graesser, A., McCarthy, P., & Cai, Z. (2014). *Automated evaluation of text and discourse with Coh-Metrix*. Cambridge: Cambridge University Press,.

Muhammad Shahid Farooq, Muhammad Uzair-Ul-Hassan, & Wahid. (2012). Opinion of Second Language Learners about Writing Difficulties in English Language. *A Research Journal of South Asian Studies, 27*, 183–194.

Mukherjee, J., & Huber, M. (2015). *Corpus linguistics and variation in English: Theory and description*. BRILL.

Norris, J., & Ortega, L. (2009). Measurement for understanding: An organic approach to investigating complexity, accuracy, and fluency in SLA. *Applied Linguistics, 30*, 555–578.

North, B. (2007). The CEFR illustrative descriptor scales. *The Modern Language Journal, 91*(4), 656–659.

OECD, K. (2018). *OECD science, technology and innovation outlook 2018*. Paris: OECD publishing.

Ortega, L. (2003). Syntactic complexity measures and their relationship to L2 proficiency: A research synthesis of college-level L2 writing. *Applied Linguistics, 24*, 492–518.

Pizorn, K. (2014). The development of a CEFR-based scale for assessing young foreign language learners' writing skills. *Linguistica, 54*(1), 241–259.

Rahman, T. (2016). The development of English in Pakistan. In G. Leitner, A. Hashim, & H. Wolf (Eds.), *Communicating with Asia: The Future of English as a Global Language* (pp. 13–27). Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781107477186.002.

Siddiqui, Shahid 2016). *Education in Pakistan, Politics, projections, and practices published* (published by) (p. 320). Oxford university press,.

Verspoor, M., Schmid, M., & Xu, X. (2012). A dynamic usage based perspective on L2 writing. *Journal of Second Language Writing, 21*, 239–263.

Wisniewski, K. (2017). Empirical Learner Language and the Levels of the *Common European Framework of Reference. Language Learning, 67*, 232–253.

Wolfe-Quintero, K., Inagaki, S., & Kim, H. Y. (1998). *Second language development in writing: Measures of fluency, accuracy, & complexity* (p. 187). Honolulu: University of Hawai'i Press,.

Yang, W., Lu, X., & Weigle, S. A. (2015). Different topics, different discourse: Relationships among writ- ing topic, measures of syntactic complexity, and judgments of writing quality. *Journal of Second Language Writing, 28*, 53–67.

Ghulam Abbas Khushik demonstrates a deep interest in second or foreign language acquisition and learning, especially a second or foreign language. The primary focus area is the automated examination of linguistic attributes in the writings of second or foreign-language learners. In particular, they are captivated by the intersection between second language acquisition, assessment, and natural language processing. His doctoral dissertation is on the topic "How do the Common European Framework levels differ in terms of linguistic features?: analysing English language learners' written corpora by using Natural Language Processing tools" His research has garnered significant recognition and has been published in reputable academic journals such as Applied Linguistics and the European Journal of Applied Linguistics, Assessing Writing, and Language Assessment Quarterly.